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VALUE CREATION AND CAPTURE IN BUSINESS ECOSYSTEMS FROM THE BUSINESS MODEL'S PERSPECTIVE

Master's Thesis
International Business Management
January 2019

UNIVERSITY OF OULU
Oulu Business School

ABSTRACT OF THE MASTER'S THESIS

Unit
International Business and Management

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Title
Value Creation and Capture in Business Ecosystems from the Business Model's Perspective

Subject	Type of the degree	Time of publication	Number of pages
International Business	Master's Degree	2019	89+11

Abstract

This thesis explores the concepts of business model, value creation and capture, business ecosystems and their relations to each other. While as the value network consists of linear relationships between actors, business ecosystems encompass relationships that are more diverse and tend to be more value capture-oriented. Business models are competing and collaborating simultaneously in ecosystems, this encourages value co-creation and co-capture. This co-evolution of business models enables and fosters ecosystem ecology. There are numerous actors interacting across the IoT ecosystem forming the complex interdependence and interconnection between and among different stakeholders, hence IoT is chosen as a context to study how ecosystem shapes value creation and value capture from the business model's perspective.

Four propositions are made based on the theoretical review and empirical evidence. 1) In comparison with the traditional value chain, value co-creation and co-capture are more dynamic in ecosystems. 2) In comparison with the traditional value chain, the value can be co-created and co-captured through platform business model in ecosystems. 3) In comparison with the traditional value chain, the value is co-created and co-captured through open innovation in ecosystems. 4) Value creation and capture can be maximized by creating own business ecosystem, yet it requires more resources and therefore lead to higher risks.

The research methodology chosen for this thesis is a qualitative approach. Both the tradition of exploratory expert interviews focusing on exploring certain central dimensions and highlighting the expert status of the interviewee, and thematic interviews steered to stress on the flexible structure and open discussion is utilized.

New themes are formed after transparent data analysis and reflecting on the theoretical and empirical findings. 1) Combining TVC and ecosystem value chain instead of choosing either or. 2) Platforms allow value co-creation and co-capture, yet a lack of track record of performance indicate higher risks for new platform business. 3) It is critical to managing the degree of openness in the open source business model but it is possible to face the challenge with some tools. 4) Creating one's own ecosystem does not necessarily lead to maximum value creation or capture, but it certainly involves high risks and requires heavy investments.

To answer the research question in short: value capture and value creation are more dynamic in ecosystems. It is not applicable for firms to maximize the creation and capture of value because increased value creation generally goes hand in hand with lower value capture. Value creation and capture are not monotone transformations of one another. Ecosystemic business models such as platform businesses and open innovation businesses enable value co-creation and co-capture. Among others, it is better for startups to find relevant ecosystems and become key players in them for optimizing value creation and capture. As business models other industry players are using affect value creation and capture, one needs to foresee the reaction of other firms when choosing, innovating, or reforming a business model.

Keywords
Business Model, Ecosystem, Value Creation and Capture, Platform Business, Open Innovation, IoT

Additional information

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1. INTRODUCTION

1.1 Backgrounding to topic

"Uber, the world's largest taxi company, owns no vehicles. Facebook, the world's most popular media owner, creates no content. Alibaba, the most valuable retailer, has no inventory. Airbnb, the world's largest accommodation provider, owns no real estate". Many have quoted this description has been seen frequently in various business contexts and social media. Indeed something incredibly disruptive has happened. It is fascinating how these companies have succeeded in what they are doing, and how startups revolutionize the business world from limited resources. My own interpretation is that business model is the key. Existing businesses are striving to transform their business or their business model. New businesses emerge much like the bamboo shoots after the rain. Corporates can no longer be the monopolist as they use to be.

Traditionally, businesses operate in value chains. Tradeoffs are explicit and relationships are linear. In complex businesses, network value chain is practiced. Today, drivers such as the technological development, internet, digitalization, and deregulation have led to drastic changes in business models - with or without desire. Casadesus and Ricart (2011) found a study conducted in 2009 revealing an interesting phenomenon. According to the study, seven out of ten companies are innovating their business-models and almost all companies are modifying their business models to different degree. (Casadesus & Ricart 2011). Internet of Things (IoT) - a new yet substantial business area has been developed in recent years. It is said to enable physical objects and human to transfer data over a network without

needing a direct human to human, and human to machine interaction. Due to its complex nature, there is no mature business model to be applied. Many are searching and researching for a good business model for this new type of business. As IoT industry has a very complex nature involving both hardware and software and often a large number of stakeholders, value creation and capture is no longer linear as what we observe from the traditional value chain era. This empirical finding makes it relevant to explore how business models are been innovated - especially from the business ecosystem's point of view - how value creation and value capture are shaped in today's business world.

To Casadesus and Ricart (2009), a business model is about *choices* and *consequences.* They consider business model as a set of choices, which lead to different consequences. They believe that business decision makers make further choices base on the consequences and thereafter the same circle. Some argue that this process provokes positive cycles that constantly strengthen the business model, creating a dynamic that is similar to that of network effects. As these positive cycles spin, a firm's key resources and assets increase their value, which in turn strengthens the firm's completive advantage. Casadesus and Ricart (2009) also believe that smart companies composite business models that generate virtuous cycles in order to increase value creation and capture. This means that there are ways to affect value creation and value capture in business models. Creating a positive loop in value creation and capture is the right way to compose a business model. Hence, it is relevant to find out how value creation and value capture take place differently in business ecosystems from business model perspective.

1.2 Purpose, research questions and objectives

When a firm holds a unique technology innovation that can monitor and communicate the condition of the home electronic devices such as refrigerator, coffee machine, and cooking stove, the firm is most likely to explore possible ways of doing business with that technology innovation. Is it more profitable to establish a strategic partnership with a construction company and embed the technology innovation into infrastructure projects, building so-called smart home business? Alternatively, shall the firm license the technology to electronics manufacturing company to develop smart home electronics? On the other hand, shall the firm make the physical products itself and manage the whole business on its own? These are different decisions, which affect the firm's business model.

No matter which business model the focal firm decides to use, it ultimately involves various stakeholders in the business environment, especially in today's business ecosystem. In the case of co-creating a business with another company, there is the possibility of merging two business models together. What could help in capturing and creating value while synchronizing the business models? How to aggregate business models in a way to maximize value creation and capture? New concepts such as oblique business model, ecosystemic business model, coopetition, co-creation, and co-capture emerge in recent years, due to the birth of innovative and disruptive business models. This thesis attempts to answer these questions with the following research question: *How does the ecosystem frame value creation and value creation from business model perspective?*

This study uses business models, business ecosystems as well as value creation and capture as key theories. This study aims to find out how value creation and capture is influenced in emerging business ecosystems. The research context is the Internet of Things (IoT) ecosystem, but the research result can be applied to other contexts.

1.3 Methodology

This thesis is a qualitative study. It takes an exploitative approach to investigate a wide range of business model theories relevant to the research question to build a solid theoretical ground. With regard to the empirical discussion, this thesis includes a number of interviews with experts from a big corporation, startups, and public sector to provide comprehensive perspectives and ensure the research quality.

The interview method is the thematic interview, which is best suited for interview experts in this thesis as it allows the experts to express freely and go deeper into the themes. More about the thematic thesis is described in Chapter 4.1.

The interview guide is based on a literature review and is planned prior to the interviews. The interviews are carried out with respective experts as individual face-to-face discussions at

1. The headquarter of the Elisa Corporation in Helsinki, Finland in December 2016. The expert interviewed is Kimmo Pentikäinen, Vice President, Business and Product Development of Elisa. The interview is recorded and analyzed based on the transcript.
2. NewCo Helsinki in March 2017. The expert interviewed is a serial startup entrepreneur and a portfolio startup entrepreneur Valto Loikkanen, currently CEO and Co-founder of Grow CV - a Global Fintech Group. The interview is recorded and analyzed based on the transcript.
3. City of Helsinki Economic Department in the center of Helsinki in April 2017. The expert interviewed is Jussi Nissilä, Senior Advisor of Competitiveness and International Affairs of Economic Development

Division of City of Helsinki. The interview is recorded and analyzed based on the transcript.

1.4 Structure of the study

Business networks are similar to biological ecosystems. Species in the bio-ecosystem depend on each other – the survival of one is based on the survival of the others; shareholders in business ecosystems also interact and co-evolve resulting a balance of both cooperation and competition. (Corallo & Protopapa 2011 via Mazhelis, Warma, Leminen, Ahokangas, Pussinen, Rajahonka, Siuruainen, Okkonen, Shveykovskiy & Myllykoski 2013). Taking this perspective, this thesis starts with an assumption that within a business ecosystem, different business models relate to each other, sometimes even are interdependent. Especially in the case of operating in business such as the IoT business, one's success leads to the others and vice versa, its failure can destroy the other stakeholders.

What is interesting is to see how these business models are related, what kind of relationships there are between these different business models within the same ecosystem, and how these relationships shape value creation and value capture. Can these relationships be synergized to flourish in the same ecosystem and how? Exploring new business model theory with a focus on value creation and value capture is the approach to answer the research question in this paper: *how do the ecosystems frame value creation and value creation from business model perspective.*

Next, the thesis will describe the research context. In the theoretical chapters, the study will present discussions on the role of value creation and capture in business models, and in the ecosystems, and lastly the role of business models in the ecosystem. Underlining the theoretical discussion, this thesis aims to generate a number of propositions to be tested in the empirical study, in order to answer the research question.

The empirical study of this thesis will test the propositions and elaborate on the theories with practices from not only the corporate and startup's perspectives but also the public sector. The research question will be answered based on reflecting the theoretical findings and the empirical study.

2 RESEARCH CONTEXT

2.1 The definition of IoT

Enabled by ever-cheaper sensors, input devices and identifiers, big data and data transfer protocols, the Internet of Things (IoT) refers to a phenomenon in which objects and people are able to transfer data over a network without requiring a direct human-to-human or human-to-computer interaction. Coetzee & Eksteen (2011) define IoT, as objects become part of the Internet through unique identification of each object, accessibility to the network, position, and status known, where services and intelligence is added to this expanded Internet. Their concept is to fuse the digital and physical world to influence professional, personal and social environments. It is about emerging the software and hardware to communicate among machines, objects and human beings. It combines both physical and virtual environments.

The Internet of Things has many names, such as the Programmable World, Connected Devices, Sensor Revolution, or Internet of Everything. Some suggest that one of the biggest applications of such technology lies in energy optimization: sensors deployed across the electricity grid enable utilities to remotely monitor energy usage and adjust generation and distribution flows. However, the increased level of data collection will create a massive amount of opportunities in self-monitoring of health, home management, maintenance, and a great variety of other fields, many of them consumer-centered. (Demos Helsinki 2015).

2.2 IoT as technical platform and its elements

Although there has been lots of buzz about the word “IoT”, there is a lack of a holistic understanding. According to a Senior Business Development Manager from Sonera, IoT is not about bits and pieces of a process but business process optimization using data as an enabler. Prior to utilizing data, it must be analyzed and transformed into knowledge with sensors giving it correct feeds. The chain of data-information-knowledge is valid. Correct sensor feeds is needed then to extract correct data. (Sonera 2015).

Although there is no mainstream IoT market currently, there are numerous different IoT platforms, connectivity technologies, sensors, and separate markets. According to Mazhelis et al. (2013), there are 30 identified roles in the ecosystem, such as chip manufacturer, module provider, Network operator, Network equipment provider and so on (see Appendix 1. *Definitions for the roles in the IoT ecosystem*). These roles can also be seen as elements of IoT. The essence of IoT is the interconnection of the physical world of things with the virtual world of the Internet, the software and hardware platforms, as well as the standards commonly used for enabling such interconnections, may serve as a core of an IoT ecosystem (Mazhelis et al. 2013). Examples of IoT ecosystem cores are connected device, connectivity, application services and supporting services. In a word, the IoT ecosystem needs both software and hardware. There are numerous actors interacting across the IoT ecosystem; this is significantly different from the traditional value chain.

2.3 IoT areas of application

Atzori, Iera, & Morabito (2010) outline four major domains of IoT applications, namely the *transportation and logistics* domain, the *smart environment* domain, the *personal and socia*l domain, and the *healthcare* sector. Healthcare sector as an example, its scope of IoT application includes tracking, identification and authentication, data collection and sensing (Atzori et al. 2010). The IoT domain needs to support a large number of diversified objects, based on different types of radio interfaces with very different requirements in terms of available resources.

Combining both the business perspective and the technical perspectives at various layers, Professor Ahokangas' *Business and technical perspectives on IoT* (see Figure 1 below) and further describes some of the categorizations that belong to the IoT domain.

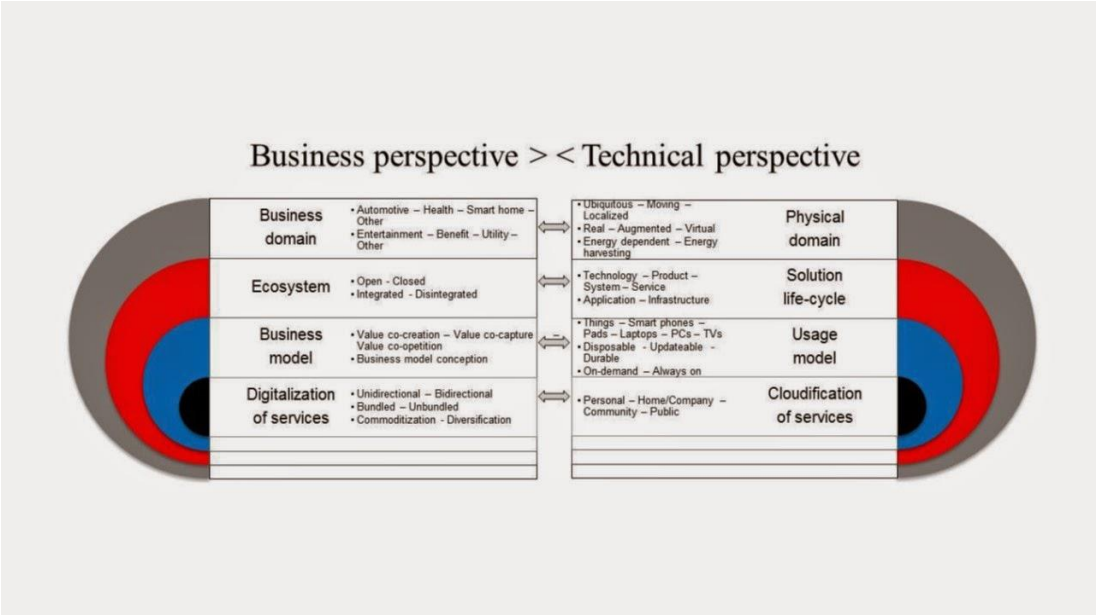

Figure 1. Relations between business and technical perspectives (adapted from Ahokangas 2014)

As the figure shows, the IoT business needs to be studied from both the business perspective as well as the technical perspective. The first layer of this figure suggests there is a relation between the Business domain (i.e., automotive, healthcare, smart home) and Physical domain (i.e., ubiquitous, moving, localized; real-augmented-virtual; energy dependent - energy harvesting). To think of an example of this relationship, the driver-less car as a business domain would require certain technology to be ready to enable the business. Another way around, when something in the physical domain (e.g., cloud technology) is developed to a certain stage, many cloud business opportunities emerge in the business domain.

The second layer of the relationship lays between the ecosystem (open - closed; integrated - disintegrated) and the solution life cycle (technology-product-system-service; application-infrastructure). Perhaps a simplified interpretation could be that if the ecosystem is an open ecosystem, it allows more solutions to join the ecosystem and the life cycle might be more vibrant with new solution joining and emerging, renewing its life cycle.

The third layer is the business model (value co-creation and value co-capture; value co-opetition; business model conception) and the usage model (things - smart phones-pads-laptops-PCs-TVs; Disposable- Updateable-Durable; etc.). Since there are different usage models, the crucial question is then how does a firm create and capture value from these different usage models. There are roughly 30 distinguished roles in the IoT ecosystems, would it be possible for the focal firm to aim at a "winner-takes-it-all" approach, or should it co-create and co-capture value with other firms? The co-opetition, referring to the approach that, firms collaborate and compete together simultaneously. Certainly, these different business models can be enabled and diversified by the usage model; and vice versa, the usage model can function as the basis for designing effective business models.

The last layers are between digitalization of services and cloudification of services. Digitalization of services includes *unidirectional-bidirectional*, *bundled-unbundled* and *commoditization-diversification*. Cloudification of services covers the range from *personal* to *home/company* to *community to public*. (Mazhelis et al. 2013).

2.4 IoT as business opportunity

The nature of the IoT environment calls for protocols, network designs, and service architectures that can cope with billions of IoT entities, and connects the suppliers of the data with the consumers. Nevertheless, the IoT business domain has enormous economic potentials as well as social and societal values; when a significant amount of innovative services and applications are enabled by connecting billions of devices promoting positive impacts for smart city, clean-tech, energy saving, healthcare and such. Ericsson (2011) estimates that around 50 billion devices will be connected by 2020. According to one estimate, the value of the IoT market stands at $14.4 trillion (Bradley et al. 2013). However, the potential can only be realized if the cost of deploying various solutions is low enough and if various devices are interoperable with each other.

The preconditions for IoT business to succeed are harsh; especially, in addition, it requires intensive collaboration between a focal firm and its stakeholders. A great technological innovation does not guarantee a successful business, especially in the IoT domain. It is said boldly, that technology per se has no inherent value (Chesbrough 2007; Chesbrough & Appleyard 2007; Zott, Amit & Massa 2011). Taking the example of Xerox Corporation and its spin-offs (Chesbrough & Rosenbloom 2002), it is very important for companies to search and study for an effective business model when the market potential is high, especially important for the successful businesses compare to the not so successful ones. Given the vital importance of the business model for entrepreneurs and general managers, it is surprising that academic research (with a few exceptions) has not given enough attention to this topic (Zott & Amit 2011). Especially due to the fact the IoT industry is at its early stage, there is no well-established business model yet.

Some argue that IoT technology is there for many companies, yet how the IoT technology is applied in business is not yet clear (Glova, Sabol & Vadja 2014). The environment for smart applications as an example, the business models have been very complex. The amount of ready-made solutions that can be taken from existing stock or supplies is not sufficient, and there are many experimentations and many failures involved (Shafers, Komninos, Pallot, Trousse, Nilsson, & Oliveira 2011 via Iivari et al. 2015). Indeed, when we think about running autonomous bus on a city street, it needs not only the physical bus, but also sensors, software, law and legislation permits, local support from the traffic authorities, etc. Thus, a ready-made smart bus does not mean a ready-made solution. However, some argues that the number of oblique business models is increasing fast. These business models transform and converge whole industries, winning market share, and endangering many firms' existing or previous business models, both vertically and horizontally. However, startups have the opportunities create and capture value in the business ecosystems, as it is impossible for a sole actor (i.e., a dominating corporate in the sector) to manage such an ecosystem. (Iivari et al. 2015 via Ahokangas 2015).

To conclude, there are various relationships on how these perspectives interact and connect with each other. Some are interdependent, some complement one

another, and some enable one another. Business models cannot only entail consequences for technological innovations but also be shaped by them. Business model complements technology, but technology is seen as more of an enabler of the business model, rather than as a part of the concept. Technological innovation can trigger changes in the company's operational and commercial activities, for instance the development of new technology such as 5G and 6G enables more business opportunities, which shapes the business model. (Zott, Amit & Massa 2011). Furthermore, since there are numerous stakeholders involved in the IoT, and it is still at its relatively early stage, this thesis suggests that when looking at the business models and the ecosystem and in the IoT domain, these relationships should be analyzed case by case.

Taking into account the special nature of IoT and the attempt to narrow down the research focus, this thesis takes the context of IoT ecosystem to explore value creation and capture from the business model's perspective. This research suggests that, especially in the IoT domain, which has the special nature of complex interdependency and relations between and among different stakeholders involved, value is co-created and co-captured.

3 VALUE CREATION AND CAPTURE: BUSINESS MODELS IN ECOSYSTEMS

Value creation and capture are terms often used, yet the term value does not have a definition of an ontological basis. Hence, it should be treated as a concept that different actors and stakeholders such as product/service provider, sales agent, customer, and consumer can perceive and construct differently. Due to the possible conflicting perceptions of the concept, it is challenging to describe the nature of value. (Grönroos & Voima 2012).

Although Grönroos and Voima (2012) declare that, the term value creation and capture are not explicitly defined, Lepak, Smith, and Taylor (2007) found in Bowman & Ambrosini's work (2000), that there are two kinds of value: use value and exchange value. Use value refers to the specific quality of a new job, task, product, or service as perceived by users in relation to their needs. As an example, a new model computer with higher speed and new technical features has higher use value. Exchange value is either the monetary amount realized at a certain point in time, when the exchange of the new task, good, service, or product takes place, or the amount paid by the user to the seller for the use value of the focal task, job, product, or service. For instance, in a case when a house owner needs to sell the house in a hurry and thus offers a much lower price than the market price, the exchange value for the seller is low while for the buyer is high.(Lepak, Smith & Taylor 2007). Therefore, Lepak, Smith, and Taylor drew a conclusion that ***value creation*** depends on the relative amount of value that is subjectively realized by a target user (or buyer) who is the focus of value creation. The target user or buyer can be an individual, an organization or a society. To realize this value, there should be an exchange of value and money, or a will for such an exchange.

What worth noticing is that value creation can mean both the content and the process of new value creation. When it comes to content, questions such as what is value/valuable, who values what, and where value resides highlight the complexity of understanding value creation. In terms of value creation as a progress, it stresses on the process how value is generated, as well as the role of management in the value

creation process. These all adds up to the confusion of the concept. (Lepak, Smith & Taylor 2007)

Value creation and value capture should be viewed as distinct processes, Lepak, Smith & Taylor (2007) claim that since the source that creates a value increment may or may not be able to capture or retain the value for the long run. Rather, the value created by one source or at one level of analysis may be captured at another. They refer this process as the "value slippage." In practice, if we think about the context of startups and its ecosystems, a new technology created by a startup (value created) might not necessarily bring the startup revenue (capturing value), if the startup fails to commercializing it and making it a scalable business. On the other hand, if this new technology is not well protected, it can be adapted by a bigger company, which manages to make money out of it. Another example can be cloud sourcing open solutions, most sources that provide solutions to an open call are often not the ones who capture value directly, but the value created might be capture by the source that creates the open call. They further propose that the *competition* and *isolating mechanisms* are the two key concepts operate across all levels of analysis in their work, to determine which party *captures the new value* that is created. As they have noted, the more innovative and effective a focal task, product or service there is, the more use value and monetary exchange value there is. (Lepak, Smith & Taylor 2007). The creation of appropriate and novel tasks, products, or services will often result in a situation where there is limited supply and high demand. The *Competition* will thus ensue, as other suppliers of the task, product, or service seek to replicate the new value that was created and participate in the profits. An *isolating mechanism* is any knowledge, physical, or legal barrier that may prevent replication of the value-creating new task, product, or service by a competitor. (Lepak, Smith & Taylor 2007) In other words, the isolating mechanism is to avoid other competitors from copying the new task, product or service created by the original firm.

Now, after understanding what is value creation and value capture, it is time to discuss why it is relevant to look at these two concepts with business model and ecosystem.

Zott, Amit, and Massa (2011) view the notions of the business model as a new unit of analysis, offering a systemic perspective on how to "do business," encompassing boundary-spanning activities (performed by a focal firm or others), and focusing on ***value creation*** as well as on ***value capture***. To them, these themes are inter-connecting and mutually reinforcing (Zott, Amit & Massa 2011). According to these views, value creation and value capture must be embedded into business model design, and vice versa, business model design must take into account value creation and capture. Some argue that ecosystem business often involves platforms, thus this chapter needs to discuss business models especially those more closely related to ecosystems.

The next pages concentrate on understanding the relationship between business models and ecosystem. It will begin with defining business model, and then continue with how value is created and captured through business models. Moving on to looking at the ecosystem - what is an ecosystem and how value creation and capture takes place within the ecosystems. After that the relationship between business models and ecosystems will be explored - how do different business models interact among themselves, and between the ecosystem. Throughout the exploration, the research question of how value creation and value capture is framed by the ecosystem from the business model's perspective is closely kept in mind.

3.1 Value creation, value capture and business model

The business model theory is very valuable. Business models link different actors and transactions to one's business. Business model can be understood as an architecture, which defines how different actors, product's features and other factors around the business. As seen in the following chapter 3.1.1, there are various business model theories and conceptualizations. Processes of value creation and value capture can link to business model theory. After reviewing business model theories, we are able to see how this linkage can be applied in practice.

3.1.1 Defining business model

However, what is a business model? As early as in 1990's, Timmers (1998) defined business model as an architecture of the product, service and information flows, including a descriptions of the various business actors and their roles; a description of the potential benefits for the various business actors; a description of the sources of revenues(Timmers 1998). In 2002, Chesbrough and Rosenbloom define it as the heuristic logic that connects technical potential with the realization of economic value (Chesbrough & Rosenbloom 2002: 529). In the same year, Magretta (2002) suggested that business model are stories that explain how enterprises work. To Peter Drucker, a good business model describes well who the customers are, what the customers value, how the business managers make money, how value is delivered to the customers, and on what cost. (Magretta 2002).

Later in 2005, Morris et al. state that business model is a concise representation of how an interrelated set of decision variables in the areas of venture strategy, architecture, and economics are addressed to create sustainable competitive advantages in defined markets. It has six fundamental components: value proposition, customer, internal process/competencies, external positioning, economic model, and person/investor factors (Morris et al. 2005). Johnson, Christensen, and Kagermann say that business models consist of four interlocking elements that, taken together, create and deliver value. These four elements are customer value proposition, profit formula, key resources, and key processes (Johnson, Christensen & Kagermann 2008). It is not hard to notice that some of the terms more or less refer to the same things, just being written in different words - such as Morris et al.'s *economic model* (2005) and Johnson et al.'s *profit formula* (2008). Meanwhile, Teece (2010) considers a business model articulates the logic, the data and other evidence that support a value proposition for the customer, and a viable structure of revenues and costs for the enterprise delivering that value. (Teece 2010).

In 2011, Casadesus-Masanell & Llanes state that detailed descriptions of business models are often too complex to be treated mathematical problems. They point out that the most common definition of a business model is the logic of the firm, the way

it operates to create and capture value for its stakeholders (Baden-Fuller, MacMillan, Demil and Lecocq 2008 via Casadesus-Masanell & Llanes 2011). To them, a firm's real business model includes a broad range of organizational and competitive elements such as products & market, sources of revenue, incentive systems, hiring policies, information technologies, and so on. Casadesus-Masanell & Llanes (2011) make it very clear that the choice of business model is strategic, not tactical. A business model is a set of committed choices that lay the ground for the tactical interactions. In other words, a business model is composed with many choices, which are to be committed.

In 2010, Casadesus-Masanell and Ricart regard business model as a reflection of the firm's realized strategy. In this respect, a business model is conceptualized after actions taken, it is less to do with supporting or steering strategy, considering it being seen as a *reflection* of what is realized.

Amit and Zott's concept of business model is cited more often than all the above-mentioned definitions. They think, business model depicts the content, structure, and governance of transactions designed so, as to create value through the exploitation of business opportunities (Amit & Zott 2001). The content of an activity refers to the selection of activities to be performed, which means what a firm does in business. The structure of an activity describes *how* the activities are linked, for instance how different marketing activities support sales or how R&D enhance a firm's competiveness yet at the same time consume money. The governance of an activity system refers to *who* performs the activities – as an example, whether a firm should carry out certain functions in-house or by outsourcing to others. To Amit and Zott, creating value through exploiting business opportunities is the essence of business model design. Simply put, it is more effective to plan a business model keeping the business opportunities in mind. There should be a need for certain values - whether it is a task, a product or a service, and then build a system to create, deliver and capture the value. (Amit & Zott 2001). Based on the ground that transactions connect activities, Amit and Zott conceptualize a firm's business model as a system of interdependent activities that transcends the focal firm and spans its boundaries, meaning that the what, how and who are not restricted within the context of the focal

firm, but rather beyond. (Zott & Amit 2010). Hereby, crossing boundaries of a focal firm as a new perspective in business modeling is a milestone that distinguishes from the traditional value chain theory.

Baden-Fuller and Mangematin (2013) suggest that business model is not a complete description of everything that a firm does, including technology; it is more general (mail order) that goes beyond explaining what has happened in a particular context to providing a configuration of cause-effect relations. They consider a business model as a cognitive instrument that consists of four major elements, namely the *customer sensing*, *customer engagement*, *monetization*, as well as *value chain and linkages*. The four mayor elements could be understood as 1) identifying customers 2) acquiring new and retaining old customers 3) commercializing 4) business logics and operations.

Zott, Amit and Massa conclude that there are various definitions of the concept Business Model - viewing it as a statement, a description, a representation, an architecture, a conceptual tool or model, a structural template, a method, a framework, a pattern, and a set (Zott, Amit & Massa 2011). According to them, despite the overall surge in the literature on business models, scholars do not agree on what a business model is. They further provide some significant insights concerning this point of view. As an example, they claim that business model literature is developing mostly in silos: e-business and the use of technology in organizations; strategic issues such as value creation, competitive advantage; and innovation and technology management (Zott, Amit & Massa 2011). Given the previously mentioned complexity in the context of IoT or ecosystemic business models, the concepts of business model developed in such silos are no longer sufficient to be applied.

Moreover, this thesis explores the strategic issues namely the value creation and capture of business model thus this thesis applies Zott & Amit's definition of a business model: A business model describes the system of interdependent activities performed by a focal firm and its partners and the mechanisms that link these activities to each other. (Amit & Zott 2015, quoted Zott & Amit 2010) An activity in

a focal firm's business model can be viewed as the engagement of human, physical, and capital resources of any party to the business model (the focal firm, end customers, vendors, etc.) to serve a specific purpose toward the fulfillment of the overall objectives.

Supporting Zott & Amit's definition of a business model as a system of interdependent activities that transcends the focal firm and spans its boundaries (Zott & Amit 2010), the *Business Model Wheel* (Ahokangas 2014) is introduced next. Professor Ahokangas argues that business models are created to exploit a business opportunity (see the center of the wheel in the figure below) and to describe actions (*what*, *how*, *why* and *where*) in business (see Figure 2 below). In other words, the Business Model Wheel highlights business opportunity as the focus of consideration. Compare with the business model canvas, the Business Model Wheel underlines exploitation processes rather than seeing the elements as blocks. Especially in the current high-tech market in which the life span of a business opportunity is relevantly short, companies need to seek new opportunities constantly and align their overall business model retaining the business opportunity as the core. Therefore, the business model wheel is considered a more action based business model.

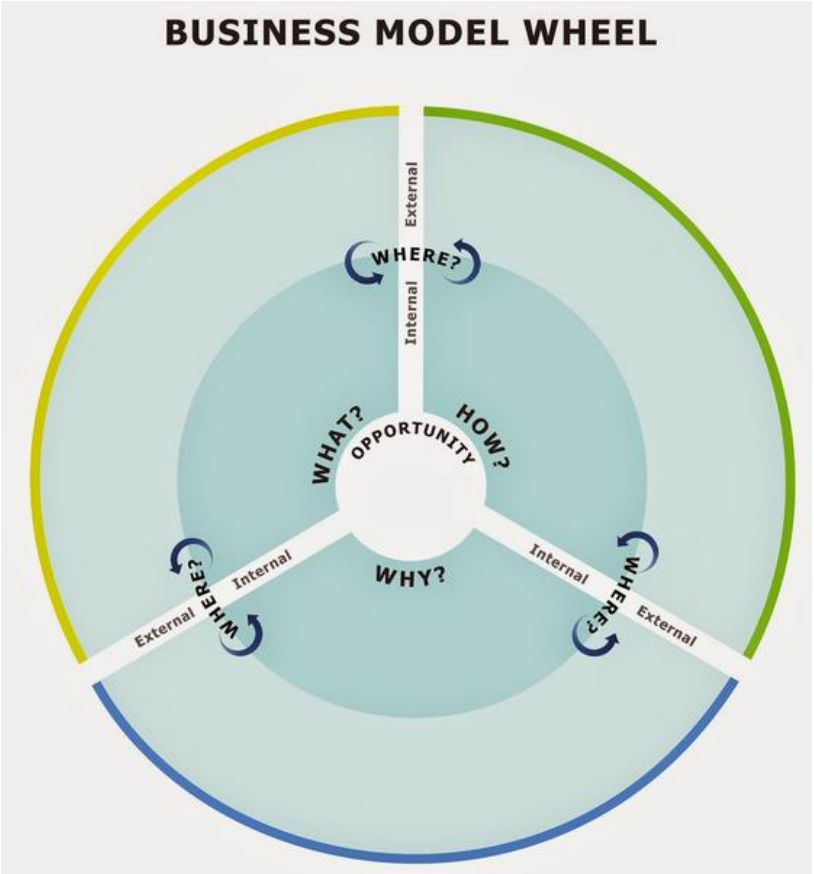

Figure 2. Business Model Wheel (adapted from Ahokangas et al., 2013)

He suggests that business model includes *partners* that can contribute in all aspects in one's business - enriching Zott and Amit's (2010) conceptualization of business model as a system of interdependent activities that surpass the focal firm and spans its boundaries. He sees a business model as not only about value creation, but also value capture. What is more valuable is that he pointed out that business model is not something static; rather, it is evolving cyclically.

Some believe that through light testing, strict and appropriate criteria for failure and success, new viable business models can be found with relatively small effort and use of resources (Ahokangas & Myllykoski 2014). This is especially true in today's vibrant startup and high-tech business environment. Everything should be lean - make an MVP fast, test it in the market at the early stage, get customer feedback rapidly and refine the MVP according to the customer feedback. (Blank 2013). A

startup which repeatedly practicing this quick and responsive development is more likely to be flexible in forming and transforming its business model.

Furthermore, business models are valuable, but over time successful models develop inertia and become hard to change, which is why business model must be developed constantly in order to restore growth and profitability to the business (Chesbrough 2011: 96). Therefore, lean start-up practices are not just for young tech ventures, large companies have started to implement them as well (Blank 2013). Even if an existing business model is proven sufficient, alternatives are being considered because changes can emerge at any moment of time. While as corporations and big companies execute a formulated business model, startups strive to look for a repeatable and scalable business model. Not only does a business model have many different definitions, business models in different industries differ from each other as well. Chesbrough (2011) states service business models differ in many ways from product business models. While product-based business models focus on the financial metrics associated with products such as inventory levels, gross margins, failure rates and such, service business models focus on *customer retention rates*, *the lifetime value of the customer*, *customer satisfaction levels*, and so forth (Chesbrough 2011). While designing and testing a firm's business model, Chesbrough suggests that it might be useful to compare other business models from other industries to those of your own; the comparison might suggest ways to emulate some aspect of a successful model from outside your industry. Since firms' models differ, it is s a good way to build more enduring alliances with other firms whose business models are most compatible with your own (Chesbrough 2011: 97).

What is a business model in practice? Below are some examples (see original from Appendix 2, *what is a business model?*) from Mark Johnson's work *Seizing the White Space,* quoted by Ovans (2015). These models come in handy for new practitioners.

- Affinity club: pay royalties to some large organization for the right to sell your product exclusively to their customers. An example could be a certain golf club brand sold exclusively in a golf club.

- Brokerage: Bring together buyers and sellers, charging a fee per transaction to one or another party. An example could be travel agencies connecting travelers with hotel businesses.
- Bundling: Package related goods and services together, such as kitchenware companies selling packages combining kitchenware and assembling service.
- Cell phone: Charge different rates for discrete levels of a service.
- Crowdsourcing: Get a large group of people to contribute content free of charge in exchange for access to other people's content.
- Disintermediation: Sell direct, sidestepping traditional intermediaries.
- Fractionalization: Sell partial use of something.
- Freemium: Offer free basic services, charge for premium service.
- Leasing: Rent, rather than sell, high-margin, high-priced products.
- Low-touch: Lower prices by decreasing service.
- Negative operating cycle: Lower prices by receiving payment before delivering the offering.
- Pay as you go: Charge for actual, metered usage.
- Razor/blades: Offer the high-margin razor below cost to increase volume sales of the low-margin razor blades.
- Reverse razor/blades: Offer the low-margin item below cost to encourage sales of the high-margin companion product.
- Reverse auction: Set a ceiling price and have participants bid as the price drops.
- Product to service: Rather than sell a product, sell the service the product performs.
- Standardization: Standardize a previously personalized service to lower costs.
- Subscription: Charge a subscription fee to gain access to a service.
- User communities: Grant members access to a network, charging both membership fees and advertising.

At a glance at the above, they seem to be easy to understand and very practical. Yet one important note about a business model is that it is not a strategy, nor a tactic. Put succinctly, the business model refers to the logic of the firm, the way it operates and how it creates value for its stakeholders. Strategy refers to the choice of business model through which the firm will compete in the marketplace. Tactics refer to the

residual choices open to a firm by virtue of the business model that it employs (Casadesus-Masanell & Ricart 2010). Not using these terms correctly can lead to poor decision-making (Casadesus-Masanell & Ricart 2011).

To be sure, the three are interrelated. Whereas business models refer to the logic of the company including how the firm operates its business and how the firm creates and captures value for stakeholders in a competitive marketplace, strategy is the plan use a set of activities to make sure that the firm has an invincible position in the market. That definition implies that the firm has made a choice about how it wishes to compete in the marketplace it has a strategy. The system of choices and consequences is a reflection of the strategy. In addition, these choices and consequences form the business model, but not a strategy. Strategy refers to the contingency plan about which business model to use. The key word is contingent. Strategies contain provisions against a range of emergent situations such as competitors' moves or environmental changes, regardless to whether they take place. All firms operate their business activities one way or another but not all the firms have a plan to make themselves unique in the market and to cope with contingencies. (Casadesus-Masanell & Ricart 2011).

In sum, a strategy is designing and building the car, the business model is the car, and tactics are how you drive the car. Introducing a better business model into an existing market is the definition of a disruptive innovation (Ovans 2015). Now that we have learned, what a business model is and what it is not. The following chapter will discuss more the relationship between the business model and value creation and value capture.

3.1.2 Value creation and capture through business model

So far, we have explored a wide number of definitions of business model, Amit and Zott appear to be the most significant academics in the research field of the business model. Zott and Amit see business model as depicting the content, structure, and governance of transactions designed as to create value through the exploitation of business opportunities (Zott & Amit 2011). As mentioned earlier at the begging of

the chapter, Zott, Amit and Massa (2011) view the notions of the business model as a new unit of analysis, offering a systemic perspective on how to "do business," encompassing boundary-spanning activities (performed by a focal firm or others), and focusing on ***value creation*** as well as on ***value capture***. Value creation and capture are interconnected and mutually reinforcing with these themes.

Even in business model innovation, the core of the activity is to better create and capture value. According to IBM's 2006 and 2008 "Global CEO Study," top management in a broad range of industries are actively seeking guidance on how to innovate in their business models to improve their ability to both create and capture value. (Casadesus-Masanell & Ricart 2009).

One of their latest publication *Antecedents of Business Model Design* (Amit & Zott, 2015) describes factors for which business model are designed; which are ultimately the question of value creation and value capture. Their study is conducted in the context of peer-to-peer (P2P) lending business, which can be considered as a business ecosystem on its own, as P2P business often have platforms, numerous stakeholders, and many other characteristics that describe an ecosystem. Moreover, this their study is the most recent study up to date. Thus, this thesis chooses to take their angle in exploring the topic of business model and ecosystem.

Amit and Zott (2015) have derived a group of antecedents of business model design. These are namely: a) Goals, b) Templates, c) Stakeholder activities, and d) Environmental constraints. Their study draws a few implications for recent business model theories and gives new insight for practitioners. They link the design antecedents to the design themes of business models (novelty, lock-in, complementarities, and efficiency). This thesis presents their study with a purpose of considering how value creation and value capture is formed, based on these antecedents.

a) **Goals to create and capture value**

Many refer to the goals of a business model design as the creation and capture of value through the fulfillment of the perceived customer needs, in other words, the goal of planning a business model is to understand customer needs and then make and deliver the products or services to fulfill their needs and/or solve their problems. Amit and Zott propose that there are ways to focus on the "goals to create and capture value". First, by balancing value creation for all business model stakeholders and value appropriation by the focal firm. This means that a firm should compete with other firms to create and protect appropriation streams, after which business managers, staffs, the firm's shareholders as well as other stakeholders compete to capture the value, which is left within the firm. Second, by responding to the needs of business model stakeholders, which enhances the lock-in-centered design theme of the resulting business model for a new venture (Amit & Zott 2015). Therefore, this first antecedent shows that the business model is designed to reach goals of value creation and value capture.

b) **Templates of incumbents and others**

This second antecedent that Amit and Zott (2015) conclude is anchored with concepts of "borrow", "default", recycle" and "vocabulary". To put it simply, *borrowing* refers to founders of new firms copy elements of other business models. This is one of the reasons to why many startups and firms observe existing business models and search for advice from investors, mentors or colleagues. *Recycling* refers to the situation when a business model designer uses aspects of business model design that have worked in the past in subsequent projects. In other words, many business managers do what they have done in similar contexts earlier. Likewise, when it comes to value creation and capture, this means that the current business model designer might repeat what they have designed earlier to create and capture value. *Vocabulary* refers to the situation when business model designers use a default model because they are not aware of any better ones, and simply follow their own "sets of images, concepts, sensibilities, tastes, preference, and logic that have been developed through time and experience". This last one is seemly similar to *recycling*, but it differs in a way that in *recycling,* at least the practice is proved to work; yet in *Vocabulary*, a business model is designed mindlessly.

c) Stakeholders' activities

Stakeholders' activities focus on cooperation with partners during the design process and to cooperation as a defining characteristic of the resulting business model design. This means that the formulation of a business model depends heavily on how the collaboration take place among different stakeholders relevant to the business. It requires the simultaneous consideration of multiple outsourcing and collaborating arrangements involving stakeholder's activities. In innovating business model, this requires a conceptualization of the set of activities that will encompass the activity system. It also requires business managers to think about how to govern and manage these activities. (Amit & Zott 2015).

Take P2P lending market space as an example, stakeholders may include banks to ensure compliance with a country's legislation and regulations; credit data firms to facilitate the risk assessment of borrowers; commercial lending firms to inject liquidity into the system; as well as payment processing firms to enable payments, amongst others. After identifying these different stakeholders (a.k.a. who), the firm has to design the set of activities with them (a.k.a. what) as well as how to govern these activities (a.k.a. how). The underlining focus in these steps is to determine how to create the value together and captured them differently.

Just like what the Cofounder of BETA states in Amit and Zott's interview (Amit & Zott 2015):"*... to some extent it is value engineering... What is the value? What can I do myself? Can we use open source software for this? Do we have to make our own? "Can we use a partner? Should we outsource some of the development? Should we do this as a long-term partner or a short-term partner*?" Needless to say, most stakeholders strive to capture as much value as possible against what they are able to offer in creating the value. For instance, especially when the partners hold greater reputations than a new venture, they know that the new venture might be more desirable to collaborate up because of their reputation, which will enhance the lock-in design theme of the new venture's business model.

d) Environmental constraints

Environmental constraints to business models include *external constraints*: economic, legal, socio-political, regulatory, and cultural environment, similar to PESTEL analysis framework. As an example, google and Facebook run great business across the world but not in China because of the nation's regulatory constraints. It also includes *internal constraints*, which concern the availability of activity-enabling resources and capabilities of the focal firm. In practice, as business model is about who performs what activities, it is understandable that the scalabilities of the business is restricted by the resources and capabilities available. This does not mean that the firm could not seek external resources and capabilities.

Concerning IoT, these challenges can lead to opportunities. Amit & Zott say that constraints are the elements of challenges in the problem situation. They can serve as stimuli to the invention of new approaches and to the creative adaptation of materials, techniques, and practices from other domains. Amit and Zott also mention the *institutional theory* as a way to validate how feasible is a business model design. Under the external factors (i.e., import legal, regulatory, technological, and industry norms and requirements) affecting the range of design alternatives and influencing activities to be carried out within the business model.

To conclude Chapter 3.1.2, Amit and Zott's findings (Amit & Zott 2015) suggest that business model designers need to pay attention to and deliver value-creating designs: goals, templates, stakeholder's activities, and environmental constraints. In practice and from the ecosystem's perspective, a business model needs to satisfy the incentive compatibility constraints of all business model stakeholders - the focal firm, the customers, suppliers, and the strategic partners. It needs to fulfill both the objectives of value creation and value appropriation in a balanced manner. It needs to contribute to better understanding of the link between objectives and outcomes of the business model design. Secondly, a business model should take advantage of templates, especially for framing and benchmarking; furthermore, strengthen the link between the templates and outcomes of the business model design. Thirdly, it needs to consider how activities performed by stakeholders could enhance business model designs by strengthening the complementarities. Amit and Zott clearly stress on shifting the focus beyond the focal firm and emphasize on seeing the business model,

as a unit of analysis that is embedded between the firm and network levels, not enter on any firm-level characteristics. In other words, when thinking about value creation and value capture in business modeling, one shall not only consider its boundary-spanning aspects but also truly take the ecosystem's perspective into the design.

To Chesbrough, business models are a way to create value for a business and then to capture at least some of that value for the organization (Chesbrough 2011: 25). Simply put, this means that business models are there to offer a product or service that could be traded and delivered to customers for profit. Chesbrough's theory on the business model is well known and widely applied, yet whether value creation is always prior to value capture remains to be questioned-can a firm capture value without creating it?

Casadesus-Masanell and Llanes (2011) argue that in the real world when selling software is the core offer, the choice of business model depends on a few factors. These factors include the type of competition the firm faces, the relevance of user innovation, and how important is the complementary good or service the firm sells in addition to software. Now, looking at software as the core value created by the focal firm, and utilizing Zott and Amit's (2011) view on business model as a tool to create and capture value, these factors that managers consider in making a business model are more or less related to value creation and value capture.

It can be concluded that if a firm wants to better create and capture value, it has to consider the business context and the firm's core value. Casadesus-Masanell and Llanes (2011) claim that there is a certain logic, which can be applied when designing a business model in practice.

Firstly, Casadesus-Masanell and Llanes (2011) suggest that a firm should choose OS (Open Source) when service and user innovation are high, and choose an MS (Mixed Source) model when either service or user innovation, or both, are not very high. (Casadesus-Masanell & Llanes 2011). Secondly, they find out that the more similar are the firms' products, the more heterogeneous are their business models. Due to which they suggest that when product differentiation is low, firms shall differentiate

through business models. On the other hand, firms shall choose to compete with different business models when user innovation is low (Casadesus-Masanell & Llanes 2011). In short, their recommendation is "compete differently than the first mover when your product is similar to that of your competitor", but also "compete differently than the first mover when user innovation is mild." (Casadesus-Masanell & Llanes 2011). From their suggestion, it is not hard to reflect on the relations of the business model and value creation and value capture - when the amount of value created is fixed or maximized, or close to what your competitor is offering, try to capture the value differently.

Although Casadesus-Masanell & Llanes find out that value creation can be maximized when choosing Open Source as a business model, open source may not be the model to maximize profits or value capture. (Casadesus-Masanell & Llanes 2011). This means that more value created does not lead to more value captured, vice versa, less openness does not lead to more value capture either. The presence of competitors affects the trade-off between value creation and value capture. How much value is captured and how much is created depends on the business models different industry players are using. When choosing a business model, one needs to foresee the reactions of other firms in the industry. (Casadesus-Masanell & Llanes 2011).

Lastly, they point out that firms should not always try to maximize the creation and capture of value. Increased value creation generally goes hand in hand with lower value capture. As a simple example, if a firm invest more money to make its core products better, there is less margin to capture, as the cost for production is higher. This is to say that value creation and value capture are not monotone transformations of one another. Thus, it is often the case that as value creation increases, value capture plummets (Casadesus-Masanell & Llanes 2011).

As depicted from Casadesus-Masanell and Llanes' (2011) research, competitors and partners are crucial factors in business model design. Amit and Zott (2010) reveal that by adopting the business model perspective, managers and entrepreneurs purposefully structure their firms' activity systems in cooperation and

interdependence with other firms and economic agents in their ecosystems. Notably, Amit and Zott not only see the importance of creating and capturing value from the business model perspective but also go beyond the traditional network and value chain theory to reach the ecosystem perspective. In fact, 10 years prior to making this statement, Amit and Zott have already concluded that strategic networks offer a wide array of sources of value creation (Amit & Zott 2000). Therefore, the most truthful and useful way to examine a firm's value creation and value capture processes is to consider it related ecosystems. This is what we are going to do in the coming chapter.

3.2 Value creation, value capture and business ecosystem

Understanding how value creation and value capture take place requires a comprehensive understanding of the business ecosystem's features and functions. This section starts with an overview of business ecosystem literature (3.2.1); Secondly, it examines how value capture and value creation can take place within the business ecosystem (3.2.2). Finally, it investigates how value capture and value creation take place specifically within an IoT ecosystem.

3.2.1 Defining business ecosystem

Moore (1996) defines a business ecosystem as an economic community supported by a foundation of interacting organizations and individuals—the organisms of the business world. In other words, business ecosystems consists companies and people. The economic community produces goods and services of value to customers, who are themselves members of the ecosystem. The member organisms also include suppliers, lead producers, competitors, and other stakeholders. Over time, they coevolve their capabilities and roles and tend to align themselves with the directions set by one or more central companies. Those companies holding leadership roles may change over time, but the community values the function of the ecosystem leader. Because the ecosystem leader enables members to move toward shared visions to align their investments, and to find mutually supportive roles. (Moore 1996). This definition is twenty years old, but it is still widely applied. Some use the bio-ecosystem as a metaphor to describe the business ecosystem - that there are various

species in the bio-ecosystem representing different stakeholders in the business ecosystem.

In conceptualizing business ecosystems, it is relevant to note that it is impossible to plan or control the developments of ecosystems completely as ecosystems are partly intentionally formed and partly a result of accidental emergence (Moore 1993). Similar to biological ecosystems, business ecosystems are very complex because there are many stakeholders involved and business operations are no longer as linear as value chain. Moreover, as many stakeholders depend on others or depend on each other, stakeholders sometimes have to cooperate and compete at the same time. Therefore, business ecosystems are also characterized by interdependence and coevolution. (Iivari et al. 2014).

Both ecosystems acknowledge the interconnection and interdependence of its members. Can ecosystem members survive alone in some cases? On the other hand, the survival of some species is based on the existence of other species in the bio-ecosystem; does success of a company always depend on external stakeholders? If that were the case, it would be relevant to find out whether there are systematic structures in the business ecosystems.

Structures of an ecosystem

According to Mazhelis & Warma's research, there are two kinds of structures of the ecosystem: a *hub-centered star structure* or a *flat mesh-like structure*. The star structure can be exemplified by the keystone model matching the typical structures in the USA. It is often more hierarchical and assumes that the ecosystem is dominated by a major hub firm interacting with a large number of small suppliers. The flat model of the business ecosystem is more typical in Europe, which composed of mainly SMEs, although accommodating also large firms. Business ecosystems are considered as networks of firms. Hubs make network robust and removal of a hub can lead to a collapse of the whole network (Mazhelis et al. 2013).

Types of roles in a business ecosystem

There are various types of roles in a business ecosystem with the most significant ones being the *keystone*, the *dominator*, and the *niche player*. A *keystone* is a hub player in the ecosystem that provides benefits for the whole ecosystem and increasing the ecosystem's chances of survival. The Intel-IBM-Microsoft ecosystem is an example of a keystone-driven ecosystem. The *dominator* eliminates and absorbs the functions of other players in their ecosystem and decrease the ecosystem diversity, thus the dominator-driven ecosystems are less stable due to such insufficient diversity to tolerate external disruptions. Apple is considered a *classic dominator* - integrating a majority of the portion of their business network vertically and horizontally, making itself responsible for value creation and capture in the ecosystem. A *niche player* covers a small portion of the network and focuses on developing a specialized or differentiated set of capabilities, due to which, the presence of niche players reduces the duplication of efforts and increases the health of an ecosystem. Usually, the niche player may exist in multiple ecosystems, increasing their leveraging power at the expense of the need to maintain multiple platforms. (Mazhelis et al. 2013).

Layers of the business ecosystem

There are three layers of the business ecosystem: *co-emerge*, *co-create* and *re-born*. The traditional competition is the competition about the value chain. Its core is about how to use firms' competencies and resources to construct own competitive advantages. Competition 2.0 breaks through the boundaries and limitations of sustaining SCA internally, and moves focus beyond the boundary of the firm, to establish value platforms with other stakeholders. Firms are more concerned with the entirety of the value platform. Through the platform, other firms can realize their potential for value creation in the system, which can be then shared by all. This system is considered as the "business ecosystem." (Liao & Sun 2012, translated by Zheng).

The first layer of the business ecosystem is called *co-emerge*, meaning that all stakeholders share tasks and collaborate for a common goal as an organic entity to create value for customers. In this way, the overall value of the ecosystem can be maximized. The core function of the co-emerge layer is to create a value platform to be utilized and shared with different business partners in the ecosystem. This aims to create value systematically. On this layer, a firm can focus its efforts on a specific market, yet significantly improve efficiency by utilizing other firms' strengths. The key is to enable participating firms to establish and maintain the platform through resource capital, intellectual capital or monetary capital. In other words, different firms and stakeholders can participate in building such a platform to simplify the process of value creation and improve efficiency, apart from creating more possibilities for value creation (Liao & Sun 2012).

The *co-creation* layer is originated from the interdependent relationships between and among the ecosystem participants. The wellbeing of each participant affects the other participant firms and the prosperity of the whole ecosystem. If participating firms cannot capture the value created within the ecosystem, it might recess from the ecosystem or move to other ecosystems. Hence, the wellbeing of the ecosystem will be endangered if the value created by the participant firms cannot be shared within the ecosystem. The key here is to create an infrastructure to allow value sharing at low cost. As an example, Apple made it possible for hundreds of thousands of other firms to locate their own software in the Apple's platform. This enables value co-creation and sharing, as well as lowering the transaction cost. At this layer, all the participating firms in the key business domain must do well because any insufficiency in any domain might harm the overall outcome. Thus, firms shall move their vision from inside the firm towards outside the firm. Firms should not capture more value than the ecosystem creates, because it might lead the whole ecosystem to collapse. (Liao & Sun 2012).

When external environment changes or when an industry goes into the mature stage of its life cycle, the industry might be going towards recession. *Re-born* refers to the phenomenon that is based on close monitoring of the current market environment and careful study of new markets, firms transit parts of its resources to a new

ecosystem, establish better collaboration framework and more healthy economic order, in order to break through into a larger future market (Liao & Sun 2012).

Briefly, there are different structures, different types of roles, and different layers of evolvements in the business ecosystems. The concept of the business ecosystem is more sophisticated and complex compare to business models. The previous chapters have discussed value creation and value capture from the business model perspective, now it is time to discuss value creation and capture from the ecosystem's perspective.

3.2.2 Value creation and value capture within the ecosystem

Comparatively speaking, while as the value network consists of linear relationships between actors, business ecosystem encompasses more and more diverse relationships. Business ecosystem tends to be more value capture-oriented. Business models in ecosystems are more about value co-creation and co-capture. Business models are competing and collaborating simultaneously, thus the term coopetition emerges. This co-evolution of business models enable and foster ecosystem ecology.

Liao and Sun (2012) conclude three characteristics of business models in an ecosystem: Light, Non-imitability & Value Maximization. These characteristics of business models in the ecosystem reflect how value creation and value capture take place within the ecosystem and how they are shaped by the ecosystem.

Light refers to the characteristic that firms no longer need to rely on internal resources and capacity to invest more and expand larger, cut cost and improve efficiency in order to become more competitive; instead, firms now can shift to utilize own resources along with other partner firms' resources to continuously create value within the ecosystem (Liao & Sun 2012).

Non-imitability refers to the characteristic that when firms shift the focus from internal to external in creating core competitiveness, from a single dimension to multi-stakeholder involvement, the core competitiveness is formed with collective competitiveness from other partner firms. It is hard to imitate this collective

competitiveness because it is an entity consisting of competitive advantages from all firms within the platform. Secondly, since business ecosystem is dynamic and more open, it attracts and allows more and more firms to join, which in turn makes it much harder for other competitors to attempt to copy such an ecosystem (Liao & Sun 2012).

Value Maximization is thus the third characteristic of a business ecosystem. A business ecosystem can be seen as a value platform, which is used by all participating firms to create and capture value. Value creation in the platform thus outperforms any of its single participating firm within the ecosystem. Through configuration within the business ecosystem, value creation can be maximized further (Liao & Sun 2012).

Liao and Sun (2012) further predict that, in the future, instead of firms competing with each other, competition is going to be between business ecosystems. Thus, creating and capturing value will be no longer a game between firms, but between ecosystems.

3.2.3 Value creation and value capture within the IoT ecosystem

If it were true that in the future, competition is not between firms and firms but between ecosystems, how it would affect firms in value creation and value capture then? If we look at IoT, an IoT platform can include a digital information storage or analytics tools, this way the layer facilitates the development of business applications that turn the data gathered by sensors into information perceived by the end-user in services and applications layer. This layer of IoT ecosystem is where data, analytics, and business intelligence conjoin to help companies make better decisions and improve productivity (Iivari et al. 2014). The IoT business involves heavily various stakeholders and various interrelated relationships between stakeholders. Firms need to understand its value chain and their role in the ecosystem in order to create and capture value. Some, for instance, Ahokangas et al. suggest that since value creation and capture are embedded within the whole ecosystem of players in the ecosystemic contexts, hence value is co-created and co-captured (Ahokangas, Alila, Hellaakoski, Kyllönen, Lehtimäki, Peltomaa, Seppänen & Tanner 2015).

As IoT business is high-tech and knowledge-intensive, one needs to understand that fundamental differences between software and hardware. Software cannot be manufactured into tangible products like hardware. Software can be bundled with a physical product and sold initially, or it can be sold separately and be deployed to a hardware that is already in use. It can be installed initially, or it can be added later. It can be static as well as changed and upgraded after sales (Messerschmitt & Szyperski 2003: 23).

When somebody purchases a book, he/she becomes the owner of the book and that can be the end of the story. Unlike most brick and mortar businesses that are selling daily commodities, the software business can be more complex. Simply put, it can be sold as a product, as a service, or as a product bundled with services; it can be sold lump sum or traded with a number of smaller payments or installments.

How do these features affect value creation and capture then? There are two modules composing the firm's offer in software business: a base (core) program and a set of extensions. The core program may be used without the extensions, but not the other way around. Extensions have no value if they are not used with the base program. Firms may open the base, the extension, or both; depending on which four business models are termed: Open Source, Open Core, Open Extensions, and Proprietary. In the open core model, the base program is open and the extensions closed, and in the open extensions model, the base program is closed and the extensions open (Casadesus-Masanell & Llanes 2011). In Messerschmitt & Szyperski's words, it is about access control. Many applications require access control, although some do not. Thus, one way to capture value is to focus on the access control in the infrastructure. The software category where infrastructure expansion occurs is often called middleware, which is added to the existing infrastructure, just below the application, to expand its capabilities (Messerschmitt & Szyperski 2003: 95). Infrastructure software faces many industry and economic challenges, overcoming issues of network effects (Messerschmitt & Szyperski 2003: 96).

The next level of software business following the software/product to infrastructure is a platform. A platform is the aggregation of all hardware and software that is assumed available and static from the perspective of the software distribution

(Messerschmitt & Szyperski 2003: 96). Typically, although not always, the platform is an infrastructure software and the distribution is an application (Messerschmitt & Szyperski 2003: 97). Iivari et al. (2016) visualizes these relationships in a practical way in their IoT Business Model Framework. They illustrate the scope and scale of value co-creation and co-capture on a horizontal level - there is a layer consists of infrastructure and hardware; a layer consists of platform and data; a layer consists of devices and application. They also demonstrate that value can be co-created and co-captured on the vertical level at different stages of a business cycle: research, technology, product, system, and service. Combining the vertical and the horizontal level, they claim that value can be co-created and co-captured at different scales base on the different stages: from no business models to emerging business models, to vertical business models, to vertical/horizontal business models, to horizontal/vertical business models and finally oblique business models.

Messerschmitt and Szyperski (2003) found out that system integration emphasizes the technical aspects, and business consulting emphasizes the organizational and needs issues. The industry consultant focuses on the needs of all firms, and the business consultant focuses on adapting applications for use in particular firms (Messerschmitt & Szyperski 2003: 176). Therefore, in analyzing how value can be created and captured in designing a business model in the context of IoT, both technical and business perspective need to been taken into account.

The following table (Table 1. How the Internet of Things changes Business Models) shows the different ways of thinking in terms of value creation and capture between traditional product mindset and internet of things mindset. Value creation for traditional products is more “this and now”; while as for IoT, it is more “now and later, this but also that”. In other words, traditionally products are created to meet customer needs at a specific time. The value of the products diminishes over time. Single point data is used as requirements for future products. However, the IoT value is not only created for now but also for later to address real-time and emergent needs in a predictive manner. (Hui 2014). In traditional product mindset, value is created by offering a stand-alone product that will be replaced or become obsolete over time. In IoT mindset, value is created by offering products that constantly refresh updates and has synergy. The role of data in IoT is more significant as it enables services.

THE INTERNET OF THINGS REQURES A MINSET SHIFT Because value is created and captured differently.			
		Traditional Product Mindset	**Internet of Things Mindset**
Value Creation	Customer needs	solve for existing needs and lifestyle in a creative manner	Address real-time and emergent needs in a predictive manner
	Offering	Stand alone product that becomes obsolete over time	Product refreshes through over-the-air updates and has synergy value
	Role of data	Single point data is used for future product requirements	Information convergence creates the experience for current products and enables services
Value Capture	Path to profit	Sell the next product or device	Enable recurring revenue
	Control points	Potentially includes commodity advantages, IP ownership, & brand	Adds personalization and context: network effects between products
	Capability Development	Leverage core competencies, existing resources & processes	Understand how other ecosystem partners make money

Table 1. How the Internet of Things changes Business Models (adapted from Hui, 2014).

With regard to value capture, traditionally, value is captured on a per-unit basis; money is earned by selling more. On the other hand, the IoT thinking is to sell in order to make recurring revenue possible. In traditional product businesses, firms can capture more value from commodity advantages, IP ownership, and brand. In the IoT era, value is captured more accordingly to different contexts and network effect between products.

Traditionally value can be captured by developing capabilities, for instance, leveraging core competencies, deploying resources and developing processes. The IoT business is about *understanding how the ecosystem partners and stakeholders make profits*. To give an example, earlier firms can capture more value by laying off employees, outsource tasks or make processes more efficient; in the mindset of everything is connected to the IoT ecosystem, firms need to *go beyond the company*

boundary to understand how others capture value - be it a competitor, supplier, or customer.

3.3 How business ecosystem frames value creation and value capture

Chesbrough thinks that large market opportunity puts many SMEs at considerable risk when they want to seize large market opportunities; in most cases, enlarging the business requires a revision, and maybe more than one of the business model. Growing beyond a niche also requires a search for external partners in the value chain (or ecosystem) to break out from its niche market (Chesbrough 2011: 143). As a practical example, a startup operating for collecting data trying to scale up its business by having more user cases in different industries such as healthcare, the startup might need to think about other business model and search for clinics or hospitals to go beyond the niche market. To change the way of value creation and capture within the ecosystem, one needs to redesign and innovate his business model. Particularly, one can imagine those firms who offer elements of IoT need to innovate their business model to go beyond their niche market to enter the larger ecosystem.

Taobao as the biggest B2C virtual platform is a good example in this case. It went through rapid growth and met severe challenges when its customers started to move towards other virtual platforms when a various problem such as counterfeit products, the bad reputation of the online vendors and having an overly diverse quality of vendors operating at the same platform. Taobao sees these changes and "gave birth to" to TaoPingPai and Tmall. These two new brands are Taobao's strategic act, distinguishing its better brands from the other traditional brands and further, help these two brands to have a new collaboration model. This transition is very light in a way that vendors and customers can move to a new ecosystem without changing transaction behavior, operating model and such. This features that value can be continuously created in response to its changing environment is considered here as "re-born", it is another superior quality of business ecosystem, in comparison to the traditional value chain.

Just as how Lehto, Hermes, Ahokangas and Myllykoski regard to the context of the cloud business, value networks are constructed to serve one purpose; they are

focused on one sole target such as producing a good product or a service more efficiently/effectively in cooperation with others with the focus on value-capture. (Lehto, Hermes, Ahokangas & Myllykoski 2013). Again, what makes the business ecosystem more sophisticated is that ecosystem refers to a broader and more holistic network of actors. These actors are competing and collaborating simultaneously within the ecosystem. They can be very different from each other by their core capabilities and operative functions and thus not only relate to a specific, already known, value chain and provide incremental improvements to it. Most importantly, the focus on value capture is shifting towards value co-creation and value co-capture. Some argue that value creation and value capture are embedded within the whole ecosystem of players in the ecosystemic contexts, value is co-created and co-captured (Ahokangas, Alila, Hellaakoski, Kyllönen, Lehtimäki, Peltomaa, and Seppänen & Tanner 2015). Some claim that the question is not about value co-creation and co-capture, but value sharing (Iivari et al. 2015).

We assume that changes in a business model affect value creation and capture. As the research topic is to find out how business ecosystem frames value creation and value capture from the business model perspective, we will present the four propositions made based on the theoretical discussions in order to further investigate the research question.

Proposition 1. In comparison with the traditional value chain, value co-creation and co-capture is more dynamic in ecosystems

Elaborating on the Business Model Wheel model (Ahokangas et al. 2013), Ahokangas and Myllykoski highlight that business models have been regarded as static descriptions, they think that a more dynamic and processual approach business model is needed to match today's turbulent, and uncertain business (Ahokangas & Myllykoski 2014). They found out that there are two phases of business model evolution. The first involves experimentation and exploration while the second refers to the exploitation phase. In the case of transforming existing business models, challenges such as dealing with conflicts and trade-offs between the old and new ways of doing business emerge during the creation stage of a new business model.

Sometimes it goes so far that the activities and logic related to the new business model can be incompatible with the status quo. However, experimentation and learning are crucial and it is evident that the business context has a major impact on both business model creation and transformation (Ahokangas & Myllykoski 2014). New ways of creating and capturing value can be found through experimentation with different stakeholders.

In comparison with the traditional value chain, the emergence of the startup scene and popularization of lean methodology in new businesses also lead to new experimentation, exploration, and exploitation. Being lean is about searching for a repeatable and scalable business model; it is about trial and error. Startups are striving to find ways to co-create and co-capture value from their innovation. From this perspective, we argue that value co-creation and co-capture become more dynamic and contingent than ever before. Again, this does not necessarily apply in all cases such as in traditional brick and mortar businesses, which are operated using the traditional value chain business model.

Proposition 2. In comparison with the traditional value chain, value can be co-created and co-captured through platform business model in ecosystems.

Platform business is a business model that creates value by facilitating exchanges between two or more interdependent groups, usually consumers and producers (Moazed 2016). Platforms with connected technologies can scale in ways that traditional businesses cannot. Successful platforms enable exchanges by reducing transaction costs and/or by enabling externalized innovation. It is important to note that platform is not a website, or a mobile application. Exchange platform are dependent on what core value is being exchanged. There are two types of platforms, naming the Exchange Platforms and the Maker Platforms. (Moazed 2016)

Exchange platforms include: 1) Services Marketplace where services are being exchanged such as UBER, Hotel Tonight and Airbnb; 2) Product Marketplaces such as Amazon, eBay and Etsy; 3) Payment Platform (P2P or B2C payment platforms) such as PayPal, Square, LevelUp, and Google Wallet; 4) Investment Platform where

money is in exchange for a financial instrument such as CircleUp, PROSPER, and LendingClub; 5) Social Networking Platforms such as Facebook, Linkedin, Renren, Nextdoor, and tinder. 6) Communication Platform; Development Platform such as Skype, WhatsApp, Dropbox, Snapchat, and Wechat.

Maker Platform includes 1) Closed Development Platform such as TRIDIUM, Fitbit, and salesforce; 2) Controlled Development Platforms such as iOS, android+, Google play services and Windows 8; 3) Open Development Platform such as android-, Google play services, and Linux. 4) Content platform such as Twitter, Instagram, Medium, Twitch, Youtube, and amazon kindle. (Moazed 2016)

According to Chesbrough (2011: 105), the most valuable type of business model is the platform business model. Collaboration is critical for building platforms. A smaller firm might find a services market to be an attractive size for it when that size would be too small to interest a large firm, so they move to join a prospective platform while it is still in the early stages of growth. Thus, it is arguable that compare with the traditional value chain, platform business model accommodates value co-creation and co-capture better. Some large firms provide extensive technical information, co-marketing opportunities, and even occasional subsidies for smaller firm's R&D costs in hopes of attracting them into offering services that support the large firm's platform (Chesbrough 2011: 152). This is explains well why big corporates such as Apple and Google have been active in collaboration with startups. They are able to discover and/or create business opportunities, co-create and co-capture value with other partners in their platforms because they see the whole picture of the ecosystem, beyond the focal firms.

Proposition 3. In comparison with the traditional value chain, value are co-created and co-captured through open innovation in ecosystems.

To Chesbrough, it is "the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively." It is one way of creating and capturing value in the business ecosystem. In 2014, Chesbrough et al. stated that a firm might have an open

innovation strategy but a closed business model, or a closed innovation strategy with an open business model (Chesbrough et al., 2014 via Iivari et al. 2015). How value is created and captured not only differ in these different business models but also influenced in business model transformation. Transforming business model is about transforming an existing organization through repositioning the core business and adapting the current business model; it requires a lot from the management in finding the right balance between coordination and openness (Iivari 2015).

There are different types of openness. When the degree of openness is low but the importance of openness is high, it is called the *resource-driven openness*. When the degree of openness is high and the importance of openness is low, it is regarded as the *contractual-driven openness*. When both indexes are high, it refers to the *relationship-driven openness*. When both indexes are low, it is the *ownership-driven openness*. As a case study (Iivari et al. 2015) illustrates, a firm is able to transform its business model strategically by balancing the degree of openness of its business elements. An entirely closed model restricts innovation, whereas a pure open model makes it hard to capture value and generate profit (Soloviev et al. 2010 via Iivari et al. 2015). This is to say that even in the open innovation model, it is crucial to search the right level of openness as pure open and closed models have its weaknesses. However, ideally, the ecosystem benefits from having a business model with an open source, in which the ecosystem jointly co-creates value for its customers (Casadesus-Masanell & Llanes 2011).

From the business model ecosystem, open innovation is about the focal firm co-creating and co-capturing value with its stakeholders. The key is to investigate how value creation and value capture can take place between and among these stakeholders from the ecosystem's point of view.

Proposition 4. Value creation and capture can be maximized by creating own business ecosystem, yet it requires more resources and therefore lead to higher risks.

Much like the blue ocean and red ocean phenomena, we argue that through creating own business ecosystem, value can be co-created and value capture can be maximized if one manages to create its own business ecosystem.

Chesbrough proposes a number of ways to innovate business models. One way is to redesign a value chain that creates and delivers the service in a more effective way. Another way is to transform a business model is to change the way a business charges for it. When this change occurs, it often affects other elements of the model, such as the value proposition. A business model can be redesigned by changing the target customer for the service (Chesbrough 2011: 92-93). Finally yet importantly, Business models can be innovated by linking the business model into a larger business network or *ecosystem* or, ideally, *create one of your own*. Connecting to a larger network raise your profile within that network and brings others using that network to you as a possible provider. (Chesbrough 2011: 69). Chesbrough uses the examples of GE and Xerox, which have transformed their business models in ways that convert their business from one that makes products to one that delivers services (services that, to be sure, are anchored by products and technologies). Their service-oriented business model broadens the scope of activities that each undertakes on behalf of clients (Chesbrough 2011: 131). Apple's iPod business is yet the classic example of how to rethink value proposition; reconsider revenue streams; and even more, how one business model could lead to creating a whole ecosystem.

The process of designing and transforming a business model can reform value creation and capture. Certain regulations can prevent the winner-takes-all (WTA) phenomenon, although there are important trade-offs associated with simultaneously pursuing aggressive WTA strategies. (Cenamo & Santalo 2013 via Amit & Zott 2015). Even though business ecosystems stress on value co-creation and co-capture, regulations must be made to avoid market monopoly and prevent any firm from capturing all the profits, which are supposed to be shared with others.

To conclude, in the business ecosystems, it is possible to link different actors to each other in order to create innovative and disruptive business models. Due to digitalization, transformations in business environment take place faster and more

radically than earlier. What kinds of business models facilitate value creation and value capture in the most optimal way in the IoT businesses? Business practitioners shall consider shifting from the perspective of the traditional value chain to the business ecosystem in constructing and transforming their business models. The ecosystemic business model approach takes into account the viability of the business model, the evolution of the business model, and its place in the product or service lifecycle. This approach covers the logic to create, share, deliver and capture value, regardless whether it is in a free or a defined process. It is important to take into account how feasible the business model is; how it might possibly evolve over time; and how it can cope with the product lifecycle before evaluating whether or not value creation, value capture, and value sharing take place in a deliberate manner. An oversimplified but good example can be, a high-tech startup taking too much time in designing a business model to capture maximum profit ending up losing the business opportunity because of other competitors entering the market first. In that case, value is lost before it is captured.

If we think about the IoT industry, collaborating with different actors in the field allows a firm to access to changes and information more rapidly. Since stakeholders rely upon each other more or less in the ecosystem, would they support each other? Since all these stakeholders are dependent on each other, value must be shared, or there is no reason for anyone to join this network. Is it more substantial to one's own ecosystem, then? Taking the example of Apple creating the entire music business ecosystem with its iPod, does it always require enormous resources? Does it always signify tremendous risk then?

This chapter concludes a comprehensive overview of business model and business model innovation, in addition to the four propositions made according to the theoretical discussion. Each proposition suggests a certain change of dynamics of value creation and capture in specific business models in the business ecosystem. It is important to examine these propositions with empirical evidence. The next chapter will present the research design and methodology - how to collect what data from where, and how to use these data collected to best answer the research question.

4 METHODOLOGY

This chapter describes the research design and methodology, as well as the method of data collection and data analysis. The chapter also provides a rationale for the methodological choices of this thesis.

4.1 Research design and methodology

This thesis sets an explorative goal to explore how value creation and capture takes place in ecosystemic business models. Typically, qualitative studies do not aim for generalizability; rather they are to gain a profound understanding of the topic of interest. Because of the explorative nature of this study and as the research context is an emergent and constantly changing phenomenon, the qualitative research methodology is chosen.

When it became clear that the qualitative approach would serve the research interests better than quantitative, it is important to choose a methodology that would suit the specific needs of the research topic. It is clear that learning about the research topic requires gaining insights from experts who are familiar with the latest developments of the ecosystemic business models and who have hands-on experience of value capture and value creation in these business models. Expert interviews as a method is hence considered the most suitable to answer the research questions.

4.1.1 Exploratory expert interviews as an interview method

Bogner, Littig & Menz (2009) offer three reasons for why interviewing experts provide useful insight to research problems. First, talking to experts is a very efficient and concentrated method to gather data and obtain good results. Secondly, the organizational structures behind the experts in institutions can serve as an easy point of entry to the field of research. The researcher's access to the field improves remarkably, if the person being interviewed holds a key position in the organization. Thirdly, the expert interview is a competent method for approaching topics, which are in rapid transformation, not known by laypeople and difficult to quantify (Bogner

et al. 2009: 1-2.). As presented throughout this thesis, the research topic is in rapid transformation, not knowing much, and difficult to quantify, the expert interview is the most justifiable choice compare to other research methods.

When choosing the interviewees, it was important to define what makes an expert in the given field. Relatively speaking, it is possible to see everybody as an expert – if nothing else, at least an expert of his/her own life. Taking this kind of perspective would certainly fade out the difference between the expert interview and laypeople interview, and thus make it crooked to assume, that there would be anything special in conclusions and information that are derived from expert sources. According to Meuser and Nagel (2009), an expert is a person who is responsible for the development, implementation or control of solutions, strategies or policies. Moreover, an expert is somebody who has privileged access to information about groups of persons or decision processes. Usually, expertise is bound to a certain field or topic: an expert in one topic is not necessarily an expert in another. Therefore, defining the field of interest accurately is crucial in identifying the right experts. Quite self-evidently, one way of recognizing an expert is seeing his/her respective field of profession (Meuser & Nagel 2009). The interviewees selected for the empirical study in this research are experts in different fields of business; however, their business fields are all high tech and digital. All of them have either direct or indirect experiences in IoT business. More importantly, they all hold key positions in their respective organizations.

When interviewing experts, it is very relevant to consider what kind of information one can acquire from an expert source. It is problematic to assume that the expert knowledge obtained is fully objective. Hence, it is necessary to reconstruct the latent content of meaning in order to approach the goal that lies at the core of qualitative research in general. In addition, data must be validated carefully through a solid theoretical basis (Bogner et al. 2009: 5-6.). In this thesis, these methodological instructions will be utilized in data analysis.

Methodological literature was used as guidelines when the interviews were planned to take the interviewees expert status into consideration. Bogner and Menz introduce

three different types of expert interviews each intended for a different purpose. The first type is called the *exploratory expert interview*. It is used primarily to provide orientation and exploring a new, possibly emerging context. The second type is called the *systematizing interview*, which targets at the systematic retrieval of information. The last one is called the *theory-generating expert interview,* aiming at reconstructing social interpretative patterns and subjective action orientation criteria. (Bogner & Menz 2009.) Since this thesis is exploring a new context with emerging business models, the *exploratory expert interviews* draw the methodological guidelines.

According to Bogner and Menz (2009), *exploratory expert interviews* should be conducted as openly as possible, but purely on grounds of demonstrative competence, it is advisable to structure at least the central dimensions of the planned conversation with reference to a topic guide in advance. This feature makes expert interview different from the narrative or episodic interview. The aim is not to compare data, to acquire as much information as possible, or to standardize the data. Exploratory interviews help to structure the area of interest and generate hypotheses. The expert's role is to provide contextual knowledge. (Bogner & Menz 2009.) The objective is to explore the field of interest and utilize the insights provided by experts in this very same field. In this thesis, the expert interview methodology is used for directing the conversation toward the four propositions. Interview questions (see Appendix 3) are designed as open as possible toward the four propositions in order to let the experts bring out their valuable knowledge to each of them.

In the planning of the interview structure, the guideline of the *thematic interviews* is applied as references. The thematic interview is methodologically in between of the structured interview and the open interview. Interview questions are not designed in a very specific, detailed, ready-made manner. Instead, questions are more open and are toward certain themes. However, the thematic interview is more structured than the open interview. The themes and topics are prepared based on previous research and are the same for all interviewees, but the approaches to ask questions can be flexible. (Teemahaastattelu 2017).

It is important to note that the tradition of thematic interviews comes quite close to the tradition of expert interviews. Thematic interviews stress on the role of the researcher to keep the conversation within the theme, but not forcing the focus into a certain structure. Thus, it allows and trusts the interviewee – in this case, the expert – to show what is important, and in this way explore the research topics. The researcher shall take as little as possible memos for the interview so that he/she can focus on the actual conversation. Bullet Points, assisting questions, keywords can be prepared to ensure the flow of the conversation. In short, the thematic interview is not about asking a list of detailed questions in a strictly structured manner (Teemahaastattelu 2017). In line with the tradition of thematic interviews, a considerable amount of freedom is given to the interviewees. It would be regarded that the themes set by the researcher in advance might not necessarily be the same at the end of the research after analyzing the data, especially when there are essential contents in addition to the research topics.

To conclude, both the tradition of exploratory expert interviews and thematic interviews brought important elements to the research of this thesis - the first steered the researcher to focus on exploring toward certain central dimensions and highlighting the expert status of the interviewee, and the latter steered to stress on the flexible structure and open discussion. These methods are considered very suitable for answering the research questions.

There is no consensus of how many interviewees is enough to reach the understanding. It is considered to be the researcher's responsibility to interview as many interviewees that are needed to get the data to saturate, which means, to repeat itself and provide no more new results and findings. (Baker & Edwards 2012.) In this thesis, three experienced experts are selected to conduct the explorative expert interviews. They represent big companies, startups as well as the public sector respectively, with a purpose of collecting evidence from different perspective concerning the same topic. All interviewees hold key positions in their organizations. One way of assessing the quality of this research is to see how similar or diverse evidence the interviewees provides - in case of data being repeated and not much too

controversial evidence or new findings, the quality can be considered high. The answers to the research questions can be then regarded as reliable.

4.2 Data collection

Elisa Corporation is a Finnish telecommunication, ICT and online service company which serves 2, 3 million consumers, as well as the corporate and public administration organization customers. Established among the earliest telephone companies in the world in 1882, Elisa has been a forerunner in telecommunications many times during its long history. In 1920's, Elisa drove Helsinki to become the world's first city with automatized telephone switchboards in the entire region. In 1991, Elisa's predecessor Radiolinja transmitted the first GSM phone call in the world and launched the first commercial GSM service. Later, Elisa was the first company to open 3G and 4G networks for commercial use. (Elisa 2015a.) Elisa is listed on Nasdaq Helsinki Large Cap with over 200,000 shareholders. (Elisa 2014.) Elisa provides services for communication and entertainment. Moreover, Elisa produces tools for improving operating methods and productivity of organizations. (Elisa 2014.) According to Elisa, the company's core values are Customer Orientation, Responsibility, Renewal, Results, and Collaboration (Elisa 2015b). Just one month after the interview took place, Elisa published its financial statements release, its revenue in 2016 was EUR 1,636m euros. (Elisa 2018)

As Elisa has been a forerunner in telecommunications in history and currently the market leader in mobile subscriptions, Elisa Corporation is considered an excellent case company for the research question this thesis attempts to address. The interviewee chosen is the Vice President of Business Development and Production, Mr. Kimmo Pentikäinen. His main responsibilities and tasks include, first of all, startup partnerships (with Elisa) which ensure that Elisa do business with startups; secondly, early-stage research about creating service; and thirdly, business development in production, which concerns how Elisa is orchestrating and re-orchestrating their operations to fit in the new area of digitalization. In addition, Elisa carried out collaboration with startups in the area of IoT such as the *Elisa IoT*

Challenge. The interview took place 16 Dec. 2016 at the HQ of Elisa in Helsinki. The interview is recorded and analyzed based on the transcript.

The second interview is conducted at NewCo Helsinki in March 2017. The expert interviewed is Mr. Valto Loikkanen, a serial entrepreneur, and portfolio entrepreneur. He is a serial entrepreneur in global crowdfunding and crowd investing markets, democratizing access to capital, developing startup services and implementing metrics for cities innovation ecosystems. He also advises for three EC Horizon 2020 programs. He has been a keynote speaker in various occasions both in Finland and abroad. Currently, he is the CEO and Co-founder of Grow VC - a Global Fintech Group.

Est. 2009 Grow VC Group is the global leader of fintech innovations, digital and distributed finance services, and digital infrastructures. Its mission is to make the financial services more effective, transparent and democratic. Grow VC builds businesses that enable digital finance services globally, by offering technology, data, financial instruments and competence to disrupt the old finance models, and making it easier for anyone to implement new financial services, invest and get access to capital. It started the world's first equity crowdfunding service, and since then Grow VC introduced many new digital finance services for digital distributed data-oriented finance services. It has shifted our focus from crowdfunding more generally to fintech and digital finance, and especially on distributed digital services and infrastructure platforms and back offices (Grow VC Group 2018).

Prior to his startup career, Valto Loikkanen had worked as a business advisor for the City of Helsinki for over a decade. He initiated the very first startup accelerator in Helsinki called NewCo Factory. He has advised a significant amount of startups alongside his business. He has also produced some publications, such as the Startup Development Phase, is widely used in the Helsinki metropolitan region. The interview is recorded and analyzed based on the transcript.

The third interview is carried out at the City of Helsinki Economic Department’s office at the center of Helsinki in April 2017. The expert interviewed is Jussi Nissilä,

Senior Advisor of Competitiveness and International Affairs of Economic Development Division of the City of Helsinki. He is in charge of the ICT industry and digital economy domain for the City of Helsinki. He participates in defining and implementing innovation policy issues, as well as the Six Cities Strategy Project (6Aika hanke). In practice, he looks at the organizing, building, and developing new innovation projects with other cities, companies, or with various kinds of organizations. Within the City of Helsinki, Mr. Nissilä looks at digitalization in general and especially business related, how the city works with digital issues, how city works in R&D, and how the city develops these areas with other actors. In 2018, Jussi Nissilä started working for the Finnish Ministry of Economic Affairs and Employment as a development director. The interview is recorded and analyzed based on the transcript.

The interviews last from half an hour to over an hour. All interviews are audio recorded. The method selected for interview is called *thematic interview,* which was carried out towards the four propositions described in this thesis. All the interview questions and transcripts are available in the appendix.

4.3 Data analysis

The thematic analysis takes the concept of supporting assertions with data from grounded theory. Grounded theory framework is designed to construct theories that are grounded in the data themselves, not in theories outside the data collection. In a thematic analysis, the goal is to identify possible themes, comparing and contrasting them, and building theoretical models that translate into results of the study in this way.

Thematic interview data can be analyzed entirely quantitatively or qualitatively or combining both. In addition, the methods of linguistic analysis depend on the research question. There is no one certain way to analyze thematic interviews. In this thesis, Braun and Clarke's (2006) method was applied to analyze the data. Braun and Clarke's work has been cited over 43 thousand times according to Google Scholar alone up to August 2018. Their method is widely used and highly regarded. This thesis will use their method in analyzing the data, as described below.

Braun and Clarke (2006) divide the thematic analysis into six phases. These phases are listed below and were used as a guideline for data analysis in this thesis.

Phase 1. Getting familiar with the data. At this phase, the researcher will read the interview data several times in order to get familiar with the data.

Phase 2. Generating initial codes. At this phase, an initial list of items shall be generated. This list helps to perceive the kind of contents the empirical data included. Listing the items helps to observe patterns, similarities, and dependencies between items in the later phases of the analysis.

Phase 3. Searching for themes among codes. At this phase, the list of items (Phase 2) shall be used to examine the overarching themes. Broader patterns could be found in the data. A list of themes shall be formed. This list functions as a preliminary version of the results of the study.

Phase 4. Reviewing themes. At this phase, the list of themes shall be reviewed against the raw data. The data should be run through to examine which ones of the proposed results are truly supported by the data. Some deviations from the coded material shall be noted and elaborated.

Phase 5. Defining and naming themes. At this phase, the final themes are formed and named. Through a careful analysis, it is possible to go beyond the surface meanings of the data and form a story that could take different facets of the data coherently into consideration.

Phase 6. Producing the final report. At this phase, it shall be decided which themes are useful, which can provide concrete contributions to answer the research questions. The final themes shall be presented with a description of a logical account of the story across the themes.

Next, Chapter 5 presents the analysis of expert interviews. It includes discussions on how value creation and capture in ecosystems differ from value chains in real life, according to the experts interviewed, as well as how they view the four propositions

made by the thesis writer (described in Chapter 3). Finally, it draws conclusions on whether or not, and to what extent do the interviewees agree on the propositions, and why, with a special focus on finding out the similarities in their evidence to add credibility to answer the research question.

5. RESEARCH FINDINGS

The empirical study of this thesis includes three expert interviews, of one from a big corporation, one from the startup world, as well as one from the public sector. The purpose is to give a comprehensive understanding of the issues combining different perspectives, as ecosystemic business model thinking involves many more stakeholders and the relationships are more interconnected than traditional value chain. Throughout the analysis, each of the interviewees' point of views will be presented in discussions with other interviewees to form dialogues toward the different propositions in order to form stronger arguments. The empirical data will be reflected on with the theoretical findings in this following chapter as well as in conclusion.

5.1 Theme One - value creation and value capture in ecosystems

Before exploring value creation and value capture in ecosystems, it is relevant to understand the differences between value chains and ecosystems. All of the three interviewees think that the ecosystem is more complex. They indicate that that, ecosystems are about firms going beyond the border of the focal firm to join the collaboration and competition in the ecosystems. Although Nissilä (Appendix 6) clarifies that value as a term does not come up as often in his work in the public sector as it could possibly be in the business world, in his context, the relationships in ecosystems from his work can be e.g., how companies, organizations and the city benefit from the joint project or collaboration. According to Nissilä (Appendix 6), the concept of the business ecosystem - *the relationship of collaboration and competition* echoes with most of the theoretical findings presented in this thesis.

> *"... I think you can understand it (value chain) either as internal process of value creation or constituting from several organizations that work, basically, somebody supplies something to an organization, it might supply to another adding value to process and the ecosystem. I think (business ecosystem) it's more complex organization… I think it's also used in the business literature that … business ecosystem is sort of like a biological*

> *ecosystem, so there is some kind of platform where these organizations live and I think how I define an ecosystem is that basically the relationship of collaboration and competition…"* (Appendix 6)

It is said that crossing boundaries of a focal firm as a new perspective in business modeling is a milestone that distinguishes from the traditional value chain theory. Ecosystemic business models are indeed about going beyond boundaries. Loikkanen (Appendix 5) explains his views with slightly different words but similar ideas as above, with a bigger focus on value creation; he thinks that value can be created in different ways in ecosystems, whereas in the traditional value chain, it is linear. Interestingly, he claims that value chain thinking only captures limited value that can be created in different ways.

> *"...in the ecosystem the whole notion of using the concept of ecosystem and terminology of ecosystem is meant to bring the perspectives that is not really a value chain as such anymore, so basically that kind of the old non-ecosystem business thinking is more of the value chain thinking where something as value, at the end there is something to deliver somewhere while as in ecosystem thinking it's more multidimensional, so it's not one way but value can be created in many different ways as such. It is more multidimensional and not can really value chain thinking only capture limited amount of value that can be created in different ways"* (Appendix 5)

As repeatedly mentioned in this thesis, value chains and ecosystems differ in many dimensions, both in theory and in practice according to the experts. In response to the first proposition in this thesis that value chains are linear and ecosystems are more dynamic. Pentikäinen (Appendix 4) agrees, in addition to the other two interviewees:

> *"... if we compare the value chain in terms that you have, in terms of services, because Elisa is creating services, not hardware product, in terms of services what we have traditionally done and we are still doing it a lot, is to select the right vendors and different kinds of service providers, with whom are then delivery their solutions, which are then created as a service or a product solutions to our customers. Here I will say the differences in value chain is*

> *more like a linear order of having different phases to create the process of offering services, however in ecosystem, it's a more of an opportunity is where actually any part of the ecosystem players can define their offering, as also their customer needs, and add it for the customer to provide the services what the ecosystem can provide, right? So here its not the linear, it's not needed, so one, one integration can be also done in broader process, so providing solution even in the case that different ecosystem players are providing it together instead of... that there will be one solution provider."*(Appendix 4)

Regarding value creation and value capture in ecosystems, the way Pentikäinen (Appendix 4) thinks of IoT as a great example context to explore how value chains differ from ecosystems is almost identical with the thesis writer.

> *"... the internet of things are great examples to create ecosystems, so here (Elisa) we create IoT platform for IoT services, however here it is important we can create end to end service solution for customers, owned by us (Elisa), it needs different kinds of skills and capabilities. It requires skills on analytics it requires on application development, requires different kinds of sensors, hardware, and therefore here we are creating an ecosystem of different partners, and through those partners, we are then providing the solutions for our customers, so that's a good example of an ecosystem"* (Appendix 4)

End-to-end solution (E2ES) is a term that means that the provider of an application program, software and system will supply all the software as well as hardware requirements of the customer such that no other vendor is involved to meet the needs. E2ES includes installation, integration, and setup (tecohopedia 2018). Here Elisa providing end-to-end service solution means that they do not involve other vendors in their business but they provide solutions for customers with different partners. Here it sounds like Elisa is building an ecosystem, for which the most important asset, according to both Pentikäinen (Appendix 4) and Loikkanen (Appendix 5) is various kinds of skills.

Compared with traditional value chains, ecosystems allows more cooperation. Competitors have more rationales to become collaborators. In other words, it is almost obvious that different stakeholders co-create and co-capture value in ecosystems. In Loikkanen's words,

> " *...of course the, the easiest thing to kind of imagine is where value is created by customers so back to customers, so that's clearly quite different than value created somewhere else and then only deliver to customers, so of course we could use examples like Airbnb very easily, that one can rent their home and get income, but at the same time, they may be the same customers going to live in other places."* (Appendix 5)

The role of competition and collaboration in the ecosystemic business model to Loikkanen (Appendix 5) is that those business owners who cannot accept that cannot operate in the ecosystemic environment because the business owners need to contribute value to their competitors to be able to get value from them. To Nissilä (Appendix 6), the relationships in the ecosystem are clearly more interdependent and interconnected than those in value chains:

> *"if something goes wrong, if the platform so to speak dies, then everybody will die or suffer, so they share similar faith, some sort of element that combine these together, and, well this of course you know, it's quite far from value chain thinking, argh, you know, if you talk about value creation, I would say that you know, value chain was something before we understand the meaning and the importance of open innovation principles, so when you start to think about not only, you know, that value happens or, innovation happens, within a certain process that you can foresee and you can build, but you understand that ok there might be something going on that is of important to you and your organization outside somewhere, and immediately the idea of value chain sounds a bit funny.*

When asked the questions *"Is it always like that you have to compete and collaborate at the same time?"* Loikkanen (Appendix 5) indicates that even if at some point business owners do not want to collaborate in some areas, they would

because they would not want to harm the other business areas, in which they have been collaborating for long:

> *"If you are fighting from the same customers but you cannot exist in an ecosystem and benefit from sharing without needing to target the same customer, so in that sense... but the more you operate, usually the more you try to capture positions in the value creation interfaces in the ecosystem and at some point most likely your path will cross, but at the same time you are already partner in so deep in some other areas that you don't just to harm that part, so you just accept"*

Loikkanen (Appendix 5) further explains that ecosystem thinking is more dimensional and thus, value can be created in many different ways; value chain thinking, however, only capture a limited amount of value that can be created in different ways. In Elisa's case, there is value co-creation and value co-capture between Elisa and its customers and partners, although value in this context does not necessarily mean monetary income. When asked the question "*Do you see value creation and capture with your customers and partners differ from nowadays (in the ecosystems, in comparison to value chain)*?" Pentikäinen explains:

> "*It concerns innovation cycle here, because in digital services it concerns also an area of high uncertainties because in many cases it concerns about the services which do not have a long track record of performance. So good example of a long track record of performances is subscription business in our operation. So mobile subscriptions you can more or less make a forecast the future revenues based on previous revenues. However, when you are creating new digital services, it concerns high uncertainties. There are no historical data available to forecast the future revenues. No historical data of the user behavior or customer behavior, and the, therefore, the value creation and capture is more fundamental way process of iteration. Process of iteration in really early stage to identify what's the real value for the customer and what would be the value that the customer will see as significant that the customer is willing to buy it? Or other way willing to make a trade - whether it will be the trade in consumer side. The trade might*

be the data for instance, instead of actual transaction of money" (Appendix 4)

Nissilä (Appendix 6) thinks that there are challenges of data sharing and establishing platforms or systems for sharing data between different organizations. He further claims that in addition to the technology barriers or organization challenges, the key question is how value is created and captured in collaborations. "*We want the data to move fast so it can improve everybody's business in a way... people see that there would be added value for everybody if the data would move more, but it's difficult to decide a system that value would be kind of equal, or not equal but some fair value capture possibilities for those who are involved.*"

Concerning collaboration with the public sector such as the City of Helsinki, the role of the city in the ecosystem can be seen as an innovation platform or testbed. According to Nissilä (Appendix 6), the city can provide services for the companies to conduct their own testing, R&D or validation in which the city does not have a big role and the city does not learn much from it. The other way is that the city does collaborations with companies so the city can understand some things better and learn from experimentations. In a word, the public sector such as cities can function in the ecosystem – may be more of an innovation ecosystem than a value ecosystem (Appendix 6).

To conclude the first proposition, this study proposes that value capture and value creation are more dynamic in ecosystems - it involves more stakeholders. These stakeholders collaborate and compete simultaneously and their relationships thus become interdependent or at least interrelated. The tradeoffs for the collaborations do not need to be monetary in ecosystems. Firms need to understand their roles in the value chain and their role in the ecosystem because their business models are more likely to involve both value chain and ecosystemic operation. It is arguable whether firms can capture more value in ecosystems but what is almost certain is that there is no readymade formulation to ensure each stakeholder captures a fair amount of value in the new ecosystems.

5.2 Theme Two - platform business model in ecosystems

As previously described, a platform business is a business model that creates value by facilitating exchanges between two or more interdependent groups, usually consumers and producers. There are different kinds of platforms such as the exchange platforms and the maker platforms. Platforms with connected technologies can scale in ways that traditional businesses cannot. Successful platforms enable exchanges by reducing transaction costs and/or by enabling externalized innovation. In the case of enabling externalized innovation, this study assumes that there must be some value co-creation and or co-capture activities. Thus, this study gives a second proposition: *In comparison with the traditional value chain, value can be co-created and co-captured through platform business model in ecosystems.*

Regardless of the definitions of platform business, Pentikäinen (Appendix 4) and Nissilä (Appendix 6) do not seem to agree that the term platform is well defined. They both repeat a few times, "*it depends on how you define platform*". Pentikäinen even claims that there are only a few true platforms, namely Google and Facebook. When asked the questions "*with related to platform business in ecosystems, so how do you think the role of platforms in ecosystems?*" He says:

> "*Ok, now again the question is how you define platform, so, ugh, one could argue that there are only few true platforms, let's take as an example, on those areas which are in early stage digitalized, so in when we are speaking by the music one of the platform could be argued is Spotify, we are arguing and [unclear] that marketing, might be said that they are only apps. True platforms - google and Facebook, which are truly platforms. And now again, the question is that in now/new merging areas, where [unclear] are digitalized, like digital healthcare for instance, or mobility, there are lots of different players, who aims to be platforms, but, could it be the case there will few true platforms globally. Again, one example more, mobile device operating system, nowadays, it's fair to say that there are only few platforms there: android, iOS. Of course there are few challenges but again it seems when we are speaking about the platforms it might be fair to say that there are some truly global platforms, and in that case, in terms of speaking of*

> *platforms, it indicates in Finnish industry, the question how to utilize those platforms instead of whether I can create a platform. Then again, it's depending how you define platforms.*" (Appendix 4).

The interviewer tries to open up the definition of platform business, giving examples of Airbnb, Alibaba, Amazon and such, as presented in the previous chapter in this thesis. Pentikäinen says:

> *"Ok, so, again the platform in that perspective in defining here the platform, actually the value come from creating the… enabling the possibilities to utilize the technological or other capabilities usually with the low cost or free of charge to provide some concrete services or products for their customers. And here the value capture might be having a totally different, uh, aspect and the value capture of the entity who's utilizing the platforms, so here simple case is of course operating systems in mobile phones, so, Android operation system, is free of charge for utilizing smart device manufactures, here the value capture to Google is to collect the data, I guess that's the value capture, where they are, uh, actually, actually making the profit"* (Appendix 4)

To Loikkanen (Appendix 5), the notion of the ecosystem is first to understand that it can be different levels and different scales. Business such as Airbnb is a kind of platform model, but it does not resemble an ecosystem as a whole. He also thinks that it is impossible to control a specific ecosystem even if big businesses think that they can create and control ecosystems:

> *"Well, the example that I gave with the Airbnb is not really an ecosystem as a whole, it's just one kind of platform model, so, so it just indicates the different ways to create value that happens, in an ecosystem that can be that different levels so I would say that, the notion of ecosystem is first to understand that the ecosystems are living in different scales so you can have for example a city ecosystem, you can have a lake ecosystem, and then you can have an environment ecosystem, so when it comes to business, of course, you have the ecosystems, like big businesses want to think that they can create and*

> *control ecosystems, but then you have also ecosystems at different scale, depending on business that is not really meant to be controlled, or it can be considered that is not even possible to control a specific ecosystem."* (Appendix 5)

Here we can see that platforms might be important in enabling the ecosystems but they are not ecosystems, no matter how much want them to be. Loikkanen (Appendix 5) thinks that the role of platforms in ecosystems can be reflected as, when entrepreneurs have ecosystem thinking in their mind, they will try to draw the ecosystem around their platform business model, or try to capture how their business model fits within the ecosystem. In other words, the role of platforms in ecosystems is very important.

While agreeing on the lack of a clear definition of platform, Nissilä (Appendix 6) sees a platform as a defining infrastructure that binds the actors of the ecosystem together. It is the elementary elements of the ecosystem. He further elaborates that platforms are usually technological.

Concerning value creation and capture in platform businesses compared to the value chains, Nissilä (Appendix 6) thinks that the one who defines and controls might not own but at least controls the platform is in the best position for value capture. Simply put, it is valuable if there are many different actors, organizations, and companies using a platform in the ecosystem because there is much value through network effects or network externalities. Thus, normally there is the added value when many actors do things together as value is co-created and there are possibilities for value capture for many different actors.

When asked whether value creation and capture is more of value co-creation and co-capture in platform business, Pentikäinen (Appendix 4) states not necessarily. He points out that many scholars define one characteristic feature of the platform is that it is in enabling through that kind of features like software development kits, apps, application, protocol-interfaces, or ways to utilize the platform for creating their own services, or hardware. Again, he highlights that the platform as a concept is not well defined.

To conclude, although two out of the three experts interviewed do not believe that there is no well-defined concept for platforms, they all consider platforms technological. It is arguable whether there are more of value co-creation and co-capture in platform business, but all the experts believe that platform business enables value co-creation and co-capture. Nevertheless, there is no formulation yet for different stakeholders to capture value systematically. The experts further advise that value creation and capture in the platform business could be improved through trial and experimentation (Appendix 5), or lean methodology (Appendix 4).

5.3 Theme Three - open innovation in ecosystems

The third theme for the thematic interview explores the role of innovation and its openness in ecosystems and its relation to platforms. Although the era of open innovation has begun for many firms, there is a lack of a clear understanding of the mechanisms, inside and outside of the organization, when and how to fully profit from the concept (Enkell, Gassmann & Chesbrough 2009).

Loikkanen (Appendix 5) thinks that big companies cooperate more today than earlier, technically. It requires them to open up and create interfaces that are more open; however, many of them do not do so due to different reasons. Since open innovation business is meant to be open and thus much less in anyone's control, stakeholders in the open innovation business can either try to control things or try to harvest things (here harvest things refers to value capture). Generally speaking, entrepreneurs in value chain business implement everything and try to get what they seeded in, while as in open field and open area, entrepreneurs can harvest things what others have seeded in needing to contribute themselves. It is a different strategy and a different approach. In his words:

> *"the first thing is that it's new to them at least. The second thing is that as such they need to research it heavily because they need to look at the risks that is opposed, not only the opportunities (but) what harm could it do to their business and the notion is usually start by opening the data for example or opening our IPR, so this means that now our competitor know. For example, in banks now, EU is posing this regulation that requires banks to*

> *open up the APIs for… to access their customer and all kinds of things. Now the first notions that they think `WOW'! This is a big risk, we can lose… Our competitor see our processes but then they start to see that we also see theirs. And this creates that it becomes more genuine thing of focusing on value creation, versus trying to protect because the time protection is the point you lose more by trying to project than you can win by opening up."* (Appendix 5)

Loikkanen (Appendix 5) further explains that big companies have so-called incremental innovations, meaning they improve things by a certain percentage or so and then some versions with new features, whereas in open innovation it is a strategic approach to invent something that firms could not invent in their controlled environment. This is why it is important that it exists because disruptive innovations come easier through outside of one's business than within.

Is this the case in Elisa then? According to Pentikäinen (Appendix 4), open innovation is important in ecosystems and it is possible to pre-define terms and agree on the degree of openness in collaboration, even in value capture. His examples show that big corporations benefit from collaboration in research and collaboration with startups, and startups benefit from utilizing the resources of big corporations in capturing value differently.

> *"Surely open innovation has a key role for how for instance, uh, we are, utilizing open innovation today. It concerns in terms of research, that, that the IPRs are not the high priority, as they used to be, especially in manufacturing industry, here, the, the value capture is done, though, uh, series of successful experiments, which are orchestrated and done with different ecosystem shareholders, and that's the significant benefit for trying for the open innovation. Again, here the basic idea in terms of open innovation for instance in Elisa is that we are running quite substantial operations, 5 million consumer customers, 150 thousand enterprise customers, and all that enables different kinds of operations, uh, significant amount of data, research and what can be utilized for unknown purposes, and here, it's important to be able to tap the ecosystem of different networks of*

> *innovations, so here, especially in terms of startups and research and enabling the opportunity that they can utilize here those operations, and find something unforeseen results. So again, open innovation, I think, I believe, it requires different kind of players...”* (Appendix 4)

Clearly, there is huge potential to utilize open innovation in business today, instead of trying to do everything by oneself. Pentikäinen’s insights again coincide with theories. Chesbrough once said, "*Not all the smart people work for us. We need to work with smart people inside and outside our company*" (Enkel, Gassmann & Chesbrough 2009, quoted Chesbrough 2003). In addition, “*firms which do not cooperate and which do not exchange knowledge reduce their knowledge base on a long-term basis and lose the ability to enter into exchange relations with other firms and organizations*”. Firms can increase innovativeness through cooperation with externals, as well as reduce time to market. (Enkel, Gassmann & Chesbrough 2009). Doubtlessly there are many reasons for firms to consider open innovation in their business.

Similarly, Nissilä (Appendix 6) thinks that open innovation is essential to ecosystems. In his words, “*without open innovation ecosystem, one can still talk about value chains*.” He believes that it is very important to understand the motivation for innovation because it is in the interests of all the parties and all the actors in the ecosystem to collaborate and to add value to the platform.

Loikkanen (Appendix 5) also confirms that both the incremental innovations and open innovations are needed as they both have their own strengths and weaknesses. *“It's important to really understand the notion of open innovation – if your business tries to benefit from openness, you need to be open as well when you go into the open innovation environment; if you are trying to control the openness in the environment, the openness will start going away from you. It is like trust, if you don’t trust, others won’t trust you.”*

How open should it be then? It is claimed that too much openness can negatively influence companies’ long-term innovation success because it could lead to loss of control and core competencies. On the other hand, a closed innovation approach does

not serve the increasing demands of shorter innovation cycles and reduced time to market. Therefore, companies cannot count on pure open innovation; instead, they should invest simultaneously in closed and open innovation activities (Enkell, Gassmann & Chesbrough 2009). Is it difficult then, to control the degree of openness? Loikkanen thinks it depends:

> *"It depends on the purpose you need to control it for, ... you cannot artificially say something is open if it's not, but at the same time you need to protect the openness from someone who tries to take too much of control because then it's no longer open, so in that sense, you need to control, yes, but whose job to control may vary a lot – it may be a group, an alliance, an individual company or a government."*(Appendix 5)

Pentikäinen explains that it is possible to agree on the openness for instance in the case of research collaboration, other stakeholders can obtain confidential insights from Elisa's operation while the tradeoff for Elisa is that they could have some control on the scientific results.

> *"And again, it's important that, here, it's really minimum the different kinds of transfer of money for instance. That in terms of research, its open innovation, we agree terms of the openness for how we publishing the results, but again the main idea is to publish the scientific results, that they can have an insight of our operations which are under confidentiality, however, to make it terms that the result will be open and available"* (Appendix 4)

Nissilä (Appendix 6) has a new way of looking at when to take a close or open innovation approach. He thinks that compare to understanding the problem, solutions - be it technological or business, are somehow not that challenging or difficult to implement. Understanding the problem, he thinks, requires the openness - different views and understand different definitions of the problem and different views on how you can actually implement the solution. In other words, open innovation is the way to go if the problem is defining the problem, while in creating solutions, perhaps the best way to do it is a more closed approach. He further explains that if the cost of providing the solution is low, or if the solution is tentative, it is better to have an

open innovation process; but if the solution is costly, it is better to have a close process so that there is more control since fewer organizations are involved (Appendix 6). This is an interesting point of view, which did not come across during the theoretical discussion.

Concerning how value creation and value capture differ in traditional value chains and in open innovation businesses, Loikkanen (Appendix 5) thinks that value creation and value capture in value chains depends on agreements between different actors. Pentikäinen (Appendix 4) also gives a concrete example to illustrate how it is accomplished in the case of Elisa:

> *"... the benefit and tradeoff, in case of Elisa verse researchers and startups is that it can provide different kind of data for the researchers or research channels for the startups, our own operations to try out their products, and that will give them a living lab that they can try an experiment... On the other side, startups, here again, it's a pretty light tradeoff, so here, we think about it together if something we can sell of their products, we take the pain to do the extra work, to try to sell it to our customers, and the tradeoff is that actually revenues they are receiving, or that tradeoff is that we being the early test customer, and then through those buying to have the revenue for them."* (Appendix 4)

5.4 Theme Four - creating own ecosystem

The fourth theme of the thematic interview is about creating one's own ecosystem. This thesis has explored the dynamics between value chain and the ecosystem. There are obviously pros and cons of ecosystemic business models and their value creation and capture. How big might the risk be in one's attempt to create own ecosystem? Can entrepreneurs always capture most value through creating their own ecosystem? The fourth proposition in this thesis proposes that value creation and capture can be maximized by creating one's own ecosystem, but it always involved high risks and require vast resources.

Loikkanen (Appendix 5) considers traditional value chain differ from creating one's own ecosystem in a few ways: first, creating one's own ecosystem requires more strategic and more long-term return of investment type of development approaches, usually big companies can consider that option because smaller companies can attach themselves to the existing ecosystems; notwithstanding many companies exist in multiple ecosystems simultaneously.

> *"so either you need much longer horizon, much more effort to create an ecosystem in business than it is to create a value chain and control a value chain, so I would say, ... if you can think of it that way, that platform is already quite different to ignite if you need to create an ecosystem that have multiple platforms, you can imagine how much that takes resources and time to ignite the whole ecosystem so therefore usually… there are only very big companies that can take on the challenges of doing their own ecosystems but at the same time, there are plenty of ecosystems out there which are not controlled by any individual, and that's more natural way for them to start to join and be part of the ecosystem. At the same time, many companies belong to multiple ecosystems at the same time all the time anyway. ... So it's very multidimensional thing."* (Appendix 5)

To Pentikäinen (Appendix 4), the most efficient way of running the digital service business, among other businesses, is to combine the traditional value chain and ecosystemic business model.

> "*... in the digital service area, the most efficient way to create digital services is combining traditional value chain and ecosystem. Each stakeholder has to identify when they should have the role of being traditional value chain role, and in which case, they will be capture value also by participating to the ecosystem. Let's make it more clear, so for instance, the case of IoT ecosystem, here we have created the ecosystem, that we can utilize for instance startups, which then might making for instance sensors, those hardware sensors, we will be done through utilizing value chain, right? Through all the different kinds of equipments, and then providing the hardware. Again in some cases, we will be utilizing value chain to provide*

> *the added value for another ecosystem, for another ecosystem player, so here it's important to identify where ... is the right role in different ecosystems, and then utilizing value chain model for providing value on the specific ecosystem.*" (Appendix 4)

Pentikäinen also consider creating own ecosystem involves higher risks, but risks could be kept to the minimum through fast experimentation and starting from some specific vertical.

> *"... while creating the ecosystems, so, uh, it's always higher risks, however, again, the same principle is applicable here as also in more broadly in digital, providing digital services, that to do it through iteration, and, and the fast experimentations, and, and starting from some specified vertical, and see where to find the value capture in that ecosystem experiments, I mean that way keeping the minimum possible risks."* (Appendix 4)

Nissilä (Appendix 6) stresses that the risks are huge in creating one's own ecosystem, as it requires massive resources. Using the city as a public sector example, the City of Helsinki does not try to create an ecosystem, but rather think of ways to support innovation and development by private sector actors. As an example, creating legislation and giving resources to support traffic mobility transport and communication, instead of doing the infrastructure. He uses Maritime sector as an example to show that it is city's interests to discover the undiscovered business opportunity and engage larger amount of actors such as ICT companies and technology startups together, to foster the development of the maritime sector. These actors did not see the maritime sector as a customer to whom they could sell their products. However, he points out that it is arguable whether such network shall be called an ecosystem or a cluster (Appendix 6).

"The challenges in such an action is that it is difficult to foresee how the platform would look like in advance; how value creation and possibilities for different organizations are provided; and what sorts of agreements and standards" says Nissilä (Appendix 6). On the other hand, one of the reasons for the public sector not to create ecosystem is when there is a lack of clear ownership (Appendix 6). Taking

a possible IoT project proposal which the City of Helsinki received in recent years as an example, Nissilä explains that even there is a department responsible for IT related issues within the city, which could best work on IoT data matters, the IT department would not take on the a IoT collaboration project, just because another department requests. What he says again corresponds to the theoretical findings that integration in IoT is not only challenging technologically but also management wise.

From startups' perspective, Loikkanen (Appendix 5) considers the most critical asset in creating an ecosystem is clever people with strategic minds. "*It requires a lot of talents, a lot of understand and communication, as well as seemly humble approach, any kind of ruling behavior is not very functional*", says Loikkanen. Moreover, he also mentions that one needs a lot of time, which usually indicates also a lot of money in creating an ecosystem. Pentikäinen mentions the need for talents with various kinds of skills in creating an ecosystem, too (Appendix 4).

Regarding how value creation and value capture differ in the traditional value chain and in creating one's own ecosystem, Loikkanen (Appendix 5) adds that "*of course value chain themselves exist in different type of ecosystems and sometimes you can find or could find surprising business model opportunities by just ... looking (at) your value differently in context of ecosystem thinking could give you new interesting opportunities without really changing too many things or needing new investments to capture new value."* Loikkanen suggests thinking of value chain as usually closed or controlled, while ecosystem is *"all the way from creating and delivering just by opening up creates the opportunity to capture new value and become part of that ecosystem. All ecosystem thinking and benefits that leads to open innovation approach and harvesting. So, I would say that it doesn't need a lot financially to do this. It needs mindset and strategy around it to convert your value chain creation to create much more value directly. It is important that they are not considered as two different things".*

Nissilä stresses that data usages in the ecosystems influence value creation and value capture greatly - the more data is used, the more beneficial it is, the more value it creates, so the more value is captured, thus the more opportunities in general (Appendix 6). According to the previous chapters, the more value creation does not

lead to more value capture. In fact, sometimes more value creation leads to less value capture. Therefore, this statement needs to be confirmed with evidence, or to be applied in specific context. He acknowledges once again that it is difficult to build a system that would be fair in a way that it attracts as many companies and actors as possible.

To conclude, in comparison to the traditional value chain, this study proposes that creating one's own ecosystem requires more resources and is of higher risks. The empirical data shows, that it is generally agreed that creating owns ecosystem involves high risks, as it requires many resources. It is challenging to capture value as the development of an ecosystem, over and above, depends heavily on others. Since it is very complex, it is also much easier to fail. Moreover, even though the public sector does not have the need to create ecosystems, their roles have an impact on local ecosystem developments for instance through creating legislation.

With reference to value creation and capture, Loikkanen (Appendix 5) does not consider startups attempt to create and capture value by creating their own ecosystem to be smart. Instead, he recommends startups to find the most relevant ecosystems and try to be a significant player in them. This way allows startups to obtain strategically important positions that the ecosystem has, as value creation functions or interfaces within the ecosystem. Pentikäinen (Appendix 4) considers it most effective to combine both traditional value train and ecosystemic business model in value creation and capture, at least in the digital business areas. In other words, he does not think that value creation and capture cannot be maximized by having one's own ecosystem. Nissilä (Appendix 6) acknowledges the significance of the use of data in ecosystems. He assumes that the more data is used, the more value will be created, and thus leads to more value capture. This assumption should be studied further.

6. CONCLUSIONS

6.1 Reflection of Theoretical and Empirical Findings

Technology development such as digitalization, could technology, open source technology and so forth in the past decades have led to drastic changes in how firms do business. Coincide with Ahokangas and Myllykoski, business models are not static descpriptions anymore, if ever; in order to survive the turbulent and fast paste business environment, business managers need to use more dynamic and processual business models. (Ahokangas & Myllykoski 2014).

The business models in the context of IoT focus on understanding the role of ecosystem partners and stakeholders. Firms need to balance between openness in both innovation and business logic in considering how to create, share, deliver and capture value (Iivari 2015). In order to obtain synergy, all parts of the business model including agency, stakeholders, context, content, structure, and governance need to be reflected upon continuously.

This study do not think the winner takes it all approach is sustainable for a firm, which aims to operate in a business ecosystem for the long run. If a firm is being advised to choose a business model to create and capture as much as possible, the firm should think twice. Value creation and value capture are not positively correlated, due to which, creating more value does not lead to capturing more, and vice versa (Casadesus-Masanell & Llanes 2011).

If maximizing profit is a firm's ultimate goal, the firm can compete through innovating its business model, as to capture as much value as possible taking into account how the stakeholder firms will react, both strategically and tactically.

This study explores business model theories and attempts to investigate how ecosystem shape value creation and value capture. So, *how the ecosystem frame value creation and value creation from the business models' perspective?* Reflecting

on the theoretical and empirical findings, some of the conclusions are made as below:

First of all, although not always, firms which better understand the megatrends of business ecosystems and take into account the ecosystemic thinking can better co-create and co-capture value. As an example, theory says that business networks are similar to biological ecosystems, shareholders in business ecosystems also interact and co-evolve resulting a balance of both cooperation and competition (Corallo & Protopapa 2011 via Mazhelis, Warma, Leminen, Ahokangas, Pussinen, Rajahonka, Siuruainen, Okkonen, Shveykovskiy & Myllykoski 2013). The experts interviewed in this thesis also acknowledge this point of view in their own words. Loikkanen claims that although value chain thinking allows value to be created in different ways, firms can only capture limited value in value chains (Appendix 6). This assumes that ecosystemic business model enables more value creation and capture. Value creation and capture in ecosystems are more dynamic and complex, but it enables value co-creation and co-capture (Liao & Sun 2012). Value creation and capture used to be linear in traditional value chain business; ecosystems, on the other hand, involve more stakeholders with more complex operations and more interdependent relations, firms often need to compete and cooperate at the same time. Value is co-created and co-captured, sometimes even with end-users or customers. (Iivari et al. 2014).

Secondly, although there is a clear definition for platform business in theory - a business model that creates value by facilitating exchanges between two or more interdependent groups, usually consumers and producers (Moazed 2016), the concept and definition of a platform is not clear in the real-life business world (Appendix 4 & Appendix 6). Both the theories and empirical data suggest that platforms are very important in enabling ecosystems but they are not ecosystems. Platforms enable value co-creation and co-capture despite there is a lack of systematic ways to capture value. It is challenging to build new platforms due to various reasons, among others, the lack of historical track record makes it difficult to predict and anticipate (Appendix 5 & Appendix 4). Since some large firms provide extensive technical information, co-marketing opportunities, and even occasional subsidies for smaller firm's R&D costs in hopes of attracting them into offering services that support the

large firm's platform, it is better for startups to join existing platforms and become key players in those, than to attempt creating new platforms. Except, if the firms have a long-term strategy and excellent sets of talents and resources (Appendix 5).

Thirdly, as described previously, a firm might have an open innovation strategy but a closed business model, or a closed innovation strategy with an open business model. It is critical to manage the degree of openness in the open innovation business (Iivari et al. 2015). Value creation can be maximized through open source, but it does not maximize value capture automatically. Too much openness can affect the firms' innovation success in a negative way for the long run. On the other hand, the closed innovation approach cannot meet the demands of shorter innovation cycles and reduced time to market (Soloviev et al. 2010 via Iivari et al. 2015). It is suggested that firms should invest in closed and open innovation activities simultaneously. In addition, it is possible and advisable to agree on the matters of openness prior collaborations (Appendix 5).

Finally, creating an ecosystem involves a high level of uncertainty and risk, and requires resource investments (Appendix 4, Appendix 5 & Appendix 6). Taking an example of creating new service business, Pentikäinen (Appendix 4) explains that unlike mobile subscriptions where one can more or less forecast the future revenues based on the previous ones; the level of uncertainty is higher when creating new digital services due to the lack of historical data available to forecast the future revenues. Because of the absence of historical data of the user behavior or customer behavior, value creation and capture is a process of iteration in the early stage to identify what the real value for the customer is, and what value the customer would see as significant as they are willing to purchase, or otherwise willing to trade. Thus, creating new services requires agile experiments with light investments (Appendix 4 & Appendix 5).

To better elaborate on the answers to the research question, the four propositions will be analyzed next. These four propositions are: 1) *In comparison with the traditional value chain, value co-creation and co-capture is more dynamic in ecosystems.* 2) *In comparison with the traditional value chain, value can be co-created and co-*

captured through platform business model in ecosystems. 3) *In comparison with the traditional value chain, value is co-created and co-captured through open innovation in ecosystems.* 4) *Value creation and capture can be maximized by creating own business ecosystem, yet it requires more resources and therefore lead to higher risks.*

As described, a thematic interview differs from other interview types in a few ways. Interview questions in a thematic interview must not be strictly designed so that the interviewee can express more freely and reveal more information that the researcher might not be aware of. Data analysis to thematic interview is also different from other analysis. As mentioned, it has six phases. In short, the researcher shall read the interview data through multiple times, and then generate initial codes from observed patterns, similarities, and dependencies. After that, the researcher shall search for themes among the codes, and then review, define and name the themes.

After carefully analyzing the interview data, some of the propositions are proven valid and thus confirmed; some are challenged and thus reformulated accordingly as the following:

1) *Combining TVC and ecosystem value chain instead of choosing either or*

The first proposition "*In comparison with the traditional value chain, value co-creation and co-capture is more dynamic in ecosystems"* seem to be incomprehensive, especially when being applied to practical business management. According to the experts interviewed in this study, instead of choosing an ecosystem value chain or an ecosystemic business model, a better approach is to combine the traditional value chain and the ecosystem value chain into one's business model (Appendix 5 & Appendix 6).

Ahokangas et al. suggest that since value creation and capture are embedded within the whole ecosystem of players in the ecosystemic contexts, hence value is co-created and co-captured (Ahokangas, Alila, Hellaakoski, Kyllönen, Lehtimäki, Peltomaa, Seppänen & Tanner 2015). Unlike the traditional business world where big players enjoy the monopoly, small business and startups have the opportunity to create and capture value in the business ecosystems (Iivari et al. 2015 via Ahokangas

2015) and it is possible for startups to scale fast and to capture big markets in ecosystems today. Certainly, there are opportunities and challenges in going into ecosystems. For some businesses, it has become inevitable. The nature of interconnectedness and interdependence of the ecosystem enables value co-creation and co-capture (Liao & Sun 2012; Iivari et al. 2014). In addition to the transaction of money, value has more forms. Companies can have different tradeoffs for collaborations in ecosystems such as data. We can conclude that just as the first proposition proposes, value creation and value capture become more dynamic in ecosystems than in traditional value chains. It is worth noticing that a combination of the traditional value chain business models and the ecosystemic business models can best facilitate value creation and capture in complex businesses.

2) Platform allows value co-creation and co-capture, yet lack of track record of performance indicate higher risks for new platform business

After exploring the relevant concepts and theories and reflecting on the empirical data, the second proposition "*In comparison with the traditional value chain, value can be co-created and co-captured through platform business model in ecosystems"* seems to be self-evident. Based on the analysis of the empirical study, a developed proposition is reformulated as "*Platform allows value co-creation and co-capture, yet lack of track record of performance indicate higher risks for new platform business".*

The concept of platform business needs to be well defined if one were to discuss about platform business. Some believe that there are clear definitions and categorization of platform businesses, but some argue otherwise. Many firms refer themselves to be platform business in hope of creating an ecosystem on their own so value capture might be maximized, yet platform is only a tool to enable ecosystem. A platform does not mean an ecosystem. Even if we take the perspective that platform business enables product/service provider to co-create with customers/end users, it is still questionable whether this can lead to more value co-creation and co-capture. Reflect on Elisa's case, partnerships may help in creating platform business, and trade-off does not need to be monetary, it is a form of value co-creation and co-capture. Nonetheless, there is high risk in building platform business especially when

there is a lack of track record of performance and insufficient historical customer data, for instance in creating new digital business.

3) It is critical to manage the degree of openness in open source business model but it is possible to face the challenge with some tools

In examining the proposition "*In comparison with the traditional value chain, value is co-created and co-captured through open innovation in ecosystems*", new observations are found.

Open source fosters innovation development yet close source allows more control, the essence is finding the balance point - how open? How close? When open? When close? There are benefits for choosing either close or open innovation model, or the combination of the two, depending on various conditions. Thus, each business case shall be considered individually while making a decision on the approach. Working in ecosystems requires more openness, but it is important to manage the degree of openness. The empirical data in this thesis suggest a number of practical tools in managing the degree of openness and the timing. Firstly, one shall not try to control too much in ecosystems because it will drive the other players away. Secondly, it is possible to define issues related to openness with agreements before collaboration. Thirdly, in the public sector, open innovation works better in defining a challenge while close innovation approach might work better in developing a solution. These are but a few findings to begin with, within the limited of a master thesis.

To conclude, both the theoretical and empirical findings suggest that not only can value be co-created and co-captured through open innovation; the degree of openness can also be managed with certain tools. Thus, the third proposition rephrased to "*It is critical to manage the degree of openness in open source business model but it is possible to face the challenge with some tools"*

4) Creating one's own ecosystem does not necessarily lead to maximum value creation or capture, but it certainly involves high risks and requires heavy investments

When validating the last original proposition "*Value creation and capture can be maximized by creating own business ecosystem, yet it requires more resources and therefore lead to higher risks",* there is a lack of evidence proving that value creation and capture can be maximized by creating one's own business ecosystem. Instead, the study shows that creating one's own ecosystem does not lead to maximizing value creation or capture. However, all the experts interviewed in this study agree that creating one's own ecosystem requires a considerate amount of resource and involves high risks.

As discussed earlier in this paper, there are different kinds of ecosystems such as innovation ecosystems, business ecosystems and so forth. Ecosystems are enabled by multiple platforms, which might be owned by individuals, companies, alliances or governments. Ecosystems often require open innovation thinking. By managing the degree of openness, value creation and capture can take place dynamically. All the experts interviewed agree that value chain exists in different types of ecosystems – so it is not an "either or" situation, it is intertwined or co-existing (e.g., Appendix 5). Different ecosystems exist, joining an existing ecosystem is often more sensible because one can capture value without new investments in ecosystems by looking at value differently and finding new ways of value creation and value capture. Thus creating one's own ecosystem does not necessarily lead to maximum value creation or capture.

Therefore, the last proposition is reformulated to "*Creating one's own ecosystem does not necessarily lead to maximum value creation or capture, but it certainly involves high risks and requires heavy investments"*. The experts who contributed to the empirical study have given some practical advice to help formulating value creation and capture in ecosystemic business model, which is to conduct fast trail and experiments with light resources. Just as Ahokangas and Myllykoski suggest, new viable business models can be found with relatively small effort and use of resources (Ahokangas & Myllykoski 2014).

6.2 Managerial Implications

This thesis illustrates that a viable business model plays an important role in the success of a firm, even in high-tech companies, which the unique competitive advantage is the technology. Both the theories and the experts interviewed in this study agree that technology invention itself is not the core for success, rather, embedding the technology to enhance the competitiveness of a service or a product, as well as using a unique business model to ensure commercial potential is more critical for success. Value creation and value capture have compelling changes in ecosystems. As described in Chapter 3, there are different types of the roles in the ecosystems, it is important for managers and decision makers to have a clear vision which type of the roles their business want to pursue, and make strategic plans accordingly, taking these elements into consideration in business modeling.

Take the open innovation business model as an example. Some believe that the future lies in an appropriate balance of the open innovation approach, where the company or the institution uses every available tool to create successful products and services faster than their competitor does, at the same time fostering the building of core competencies and protecting their intellectual property

In ecosystems, value co-capture and co-creation can drive the competitive tension among firms toward a consensus of creating (new) business together, through which it fosters entrepreneurship and contributes to the building of business ecosystem. Although IoT business models enables value co-capture and co-creation, firms should create criteria for co-testing different business models, which are still in their testing phase. Both theories and the experts interviewed for this study (e.g., Appendix 4) agree that before a startup or a firm is to find out the value creation and value capture model with its partner stakeholders, it is important to focus on identifying the market and validating the business. Startups need to test their product/innovation/service at the early stage with their customers/end users; integrating clients' feedbacks in product development; find the product market fit and search for a suitable business model. The lean methodology must be practiced already in the early stage. Value creation and capture can be done through experiments with different stakeholders such as in the case of Elisa (Appendix 4).

Loikkanen (Appendix 5) has excellent insights on value co-creation and co-capture with different stakeholders such as the big companies, startups, and governments due to his hands-on experiences. He claims that big companies will do what they want to do and "*use their muscles to do so*" But at the same time, big companies are very slow and they have "*strategic limitations of navigating fast or going to different places".* In other words, big companies have their advantages when negotiating with others; however, they also have shortages such as not being able to act agile and change rapidly. This is another implication for startups that instead of looking for investments, they shall also look into the opportunity to work with big companies, which in turn make it easier to get investment. It is important to keep in mind that while negotiating with the big companies, startups are not in a disadvantaged role due to the reasons explained above.

> *"... entrepreneurs wanting to build their positions in this kind of specifying thing like new entrepreneurs or newish companies or newish things and that, just you know, entrepreneurs Mark Zuckerberg who is an entrepreneur who are... I would say, the big companies are harvesting in a way they are looking external validated innovations built by startups and so forth. I would take full opportunity of that base on that you can be quite clever and you can benefit from building relationship perhaps with multiple big companies at the same time because that's what ecosystem thinking should allow that also the big companies are not trying to control while they are working with you. So I would explore more of (how to) taking advantage of the big guys (refers to big companies) because by no means they are trying to take advantage of the small guys (refers to startup), and that's what business is about... But at the same time, it should be more and more natural just doing business together so because the big companies need the small ones more than small ones need the big ones, but the small guys usually are not so actively engaging and I would even point (out) one element here - why the reason may be, is that investors like to have an opportunity in between, investors have more interests that you don't need them, if you are able to build your business with the partnership with the big companies, but still keeping the distance and not get to sold too early. So, I would say entrepreneurs to explore partnerships*

> *with companies more, instead of only trying to seek investors as source of collaboration.* (Appendix 5)

Eric Ries says, "*If you cannot fail, you cannot learn*". However, failures and mistakes are not the same. Mistakes are quite different from failure in nature; a poorly designed experiment, which teaches us nothing new, is a mistake. In contrast to failures, mistakes waste time, resources, and initiative. To avoid making mistakes, a firm can study other's business models from other industries and build alliances with firms having compatible business models.

However, learning from others and comparing to others does not mean that one shall blindly believe in everything or imitate others. According to a research conducted by FRACTL, the biggest reason to the failure of startups is not having a viable business model. The second most common reason is running out of cash, followed by insufficient traction, lacked financing/investors, technical/product issues, no market need, and outcompeted by competitors, customer development issues and so forth. (Osterwalder, 2016). Another study carried out by CB insights argues that the top reason for startups to fail is that there is no market need, meaning that no one is willing to purchase the product or service. Other reasons for fail are running out of cash, not having a functional team with balanced skill sets, being uncompetitive and drove out from the market, production cost being too high in comparison to the price consumers are willing to pay, etc. (CB INSIGHTS 2014).

These two studies are an example that there can be numerous studies, which have contradictory or different results. There are contingencies in business operation and often cases are very contextual This is why it is not only important to keep an open eye and a hunger mind for learning, but also to view things critically since there is no rocket science to ensure success. Good research results and studies must not be applied directly to another context without considering specifics.

Lastly, both the theoretical and empirical study of this thesis shows that many of the terms and definitions related to this research topic are not well defined or commonly agreed. One should keep in mind that same words used by different people might not be referring to the same things It is good to be aware of possible gaps between encoding and decoding the messages. Nissilä (Appendix 6) highlights the complexity due to the unstandardized definition, terms, and concepts as they all have different connotations. Academics shall make it easier for practitioners because otherwise, they are not talking about the same issues as they think they are. Researchers shall find out intuitively good definitions for certain terms. It is the best way of serving people who engage in practices to tell things in a simple but very clear way.

6.3 Assessment of the quality of the research

The validity and reliability of this thesis are important attributes to the quality of research. It is necessary to define what validity and reliability mean, and how they should be measured. As a first step, it is crucial to differentiate what validity and reliability mean in quantitative to qualitative research traditions. According to Golafshani (2003), in quantitative research tradition, the stress is on the replicability of results. About validity, quantitative studies stress whether the means of measurement are accurate and whether they are actually measuring what should be measured. (Golafshani 2003, pp. 598-600).

The concepts of reliability and validity are viewed very differently by qualitative researchers. Since qualitative research does not aim for replicability but is more explorative by nature, the question of replicability in the results does not concern it. Instead, precision (Golafshani 2003 quoted Winter 2000), credibility, and transferability (Golafshani 2003 quoted Hoepfl 1997) are important criteria in evaluating qualitative research.

According to Eisner (1991, p. 58), a good qualitative study can help us to "understand a situation that would otherwise be enigmatic or confusing". Examination of trustworthiness is crucial. Seale (1999) writes that the "trustworthiness of a research report lies at the heart of issues conventionally discussed as validity and reliability" (p. 266). Lastly, Strauss and Corbin (1990)

suggest that the "usual canons of ‘good science’…require redefinition in order to fit the realities of qualitative research" (p. 250).

To answer the research question "how business ecosystem frames value creation and value capture from the business model’s perspective", this thesis explores different business model theories, based on To answer the research question "how business ecosystem frames value creation and value capture from the business model’s perspective", this thesis explores different business model theories, based on which, four propositions were made and examined with experts interviews. Several exploratory thematic interviews were conducted to collect repetitive evidence from different perspectives, in order to increase the precision of the results. The empirical interview data were transcribed in a detailed manner and analyzed accordingly with methodological recommendations.

Furthermore, the thesis aims for high credibility by making the data analysis transparent and enabling the reader to form his or her own interpretations. This is conducted by placing quotations from empirical data together with the researcher’s own analysis. The experts chosen to contribute to this empirical study of this thesis are high-level professionals who hold key positions in their respective organization. The experts managed to provide rich data combining their academic background and real-life experiences on the research topic certainly strengthen the credibility of the results.

Lastly, transferability refers to the degree to which the results of qualitative research can be generalized or transferred to other contexts or settings. This thesis includes three thematic expert interviews, covering insights from corporate, startup and public sector. Through careful analysis, there are great similarities among the evidence provided by the source.

Considering the above-mentioned reasons, one can argue that this study is of high quality.

6.4 Limitations and suggestions for further studies

There are a few limitations to be taken into consideration in this study, due to the limit of a master's thesis.

Firstly, even though this study attempts to build an in-depth understanding of an emerging phenomenon instead of aiming to generalize results, which also makes the expert interviews an excellent choice of methodology; it is typical that a small sample size limits generalizations and external validity of the findings for qualitative studies.

Secondly, although this study presents a comprehensive overview on business models, with a specific focus on some important business models related to ecosystems such as platform business and open innovation business, it must be admitted that not all the business models are explored. Ecosystemic business models could be researched more in future studies.

For future studies, the experts interviewed suggest a few topics as below:

1) It would be highly important to study in which ways the methodology of fast iteration (also called the lean startup methodology) can be utilized in identifying a functional business model and enabling value capture at minimum costs. The results of this study suggest that fast experimentation is becoming a more and more important tool as companies' work growingly in ecosystems and value chains are becoming non-linear. Growing uncertainty and rapid development of industries mean that companies cannot rely on historical data as much as they used to. This encourages companies to utilize processes where they can learn efficiently if a new approach, solution, business model, product, or service can capture or create value – or not.
2) Explore issues related to APIs from the business perspective and form standards for ecosystem players for value creation and capture - how the APIs can or cannot be used? How the data can or cannot be used?

"…the kind of key elements in this new value creation and capture is that it involves opening up, sharing data as material for innovation, new things can be created by connecting different things – new ways or data or whatever. Then it requires APIS or interfaces to deliver these different connections, these different openness and these are kinds of mandatory things. You have to have them, you have to do them, so the question to explore is related to APIs, coz the APIs interfaces – whether it's between IoT devices, software, business processes, whatever. APIs are there in between and the notion of APIs is that we all understand it needs technical interfaces. It needs like A needs to connect with A and B needs to connect with B, and you need to have documented this. But let's study or kind of seeing part of interfaces is the business rules – how the APIs can be used or cannot be used? How the data can or cannot be used? And because it's not technical, but it's like agreement type of stuff. I would argue that to accelerate this, more standards in business side of the API would accelerate more than the technical side is the limitation. Technically, it's easy. It has to work. Everyone understands. But business rules by definition would be less standard. So there would be value in studying how much standard these exist? Is there someone exploring the standards? and contributing standards for others to apply to accelerate the processes, rather than having to think their own business rules for these API themselves."(Appendix 5)

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8. APPENDICES

Appendix 1. Definition for the roles in the IoT ecosystem

Role	Description
Chip manufacturer	Designs and manufactures integrated circuits for module and device manufacturers
Module provider	Manufacturers components to produce the device or other piece of equipment.
SIM provider	Manufactures SIM cards for network operators
WSAN operator and service provider	Operates and delivers services/information from WSANs under its responsibility
Network operator	Provides connectivity between WSAN and the IoT applications; it may encompass the access (mobile or landline) network, the core network, and the transmission network.
Network equipment provider	Manufactures network elements and provides related services and offers them to network operators
Subscription management	A third party that manages SIMs and contracts on behalf of M2M users; is responsible for the roaming and switching of networks (similar to MVNO (OECD 2012, p.31)).
M2M service provider	Manages the M2M service platform.
M2M platform vendor	Produces the M2M service platform which handles device-specific tasks, including fault detection, management of SIM cards, etc
Integrator	Ensures seamless inter-operation between the devices and the M2M platform.
M2M user	Is an organization that is formally in charge of the sensor and actuator devices/network
Sensor and actuation service broker	Acts as a broker between the providers and consumers of the sensor and actuator services.
Application service provider (ASP)	Builds the application/service from the components (own or made by other service providers) and delivers it to the users.
Complementary service provider	Provides the services complementary to those of ASP.
Cloud infra provider	Provides cloud computing infrastructure services, on top of which the ASP can deploy and run the applications.
(Application) developer	Designs and develops IoT applications and services.
Distributor	Retails physical or digital goods and services.
Provisioning service provider	Deploys the application / service.
Assurance	Carries out maintenance to ensure the availability of services and guarantee that these services perform in line with SLA or QoS performance levels

Billing service provider	Provides billing services to a service operator, serving as a financial intermediary between the operator and customers.
Ad agency	Provides ads and manages ad campaigns for advertisers, acting as intermediary between the advertiser and a service provider.
Advertiser	Orders advertisements (individual or campaigns).
Content aggregator	Distributes content from different content providers to different SPs, acting as an intermediary between them.
Content provider	Provides user-generated or professionally created content.
End user	Uses the application/service provided by the ASP.
Subscriber	Negotiates and commits to the agreement with the ASP on the service and its qualities.
Standard development	Develops standards in the form of an official organization, industrial alliance or a special interest group.
Regulatory body	Controls the processes, as mandated by a legislative body.
Legislative body	Makes, amends or repeals laws.

Appendix 2. What is a Business Model?

CAN'T THINK OF A NEW BUSINESS MODEL?
Try adapting one of these basic forms.

ANALOGY	HOW IT WORKS	EXAMPLE
Affinity club	Pay royalties to some large organization for the right to sell your product exclusively to their customers.	• MBNA
Brokerage	Bring together buyers and sellers, charging a fee per transaction to one or another party.	• Century 21 • Orbitz
Bundling	Package related goods and services together.	• Fast-food value meals • iPod/iTunes
Cell phone	Charge different rates for discrete levels of a service.	• Sprint • Better Place
Crowdsourcing	Get a large group of people to contribute content for free in exchange for access to other people's content.	• Wikipedia • YouTube
Disintermediation	Sell direct, sidestepping traditional middlemen.	• Dell • WebMD
Fractionalization	Sell partial use of something.	• NetJets • Time-shares
Freemium	Offer basic services for free, charge for premium service.	• LinkedIn
Leasing	Rent, rather than sell, high-margin, high-priced products.	• Cars • MachineryLink
Low-touch	Lower prices by decreasing service.	• Walmart • IKEA
Negative operating cycle	Lower prices by receiving payment before delivering the offering.	• Amazon
Pay as you go	Charge for actual, metered usage.	• Electric companies
Razor/ blades	Offer the high-margin razor below cost to increase volume sales of the low-margin razor blades.	• Printers and ink
Reverse razor/ blades	Offer the low-margin item below cost to encourage sales of the high-margin companion product.	• Kindle • iPod/iTunes
Reverse auction	Set a ceiling price and have participants bid as the price drops.	• Elance.com
Product to service	Rather than sell a product, sell the service the product performs.	• Zipcar
Standardization	Standardize a previously personalized service to lower costs.	• MinuteClinic
Subscription	Charge a subscription fee to gain access to a service.	• Netflix
User communities	Grant members access to a network, charging both membership fees and advertising.	• Angie's List

SOURCE *SEIZING THE WHITE SPACE* BY MARK JOHNSON HBR.ORG

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Appendix 3. Interview Questions

- What's your title and area of responsibility/expertise in this organization?
- Can you describe your work area?

Proposition 1. **Value creation and value capture in ecosystems**

- How would you compare and define value chains and ecosystems?
- How do you see value creation and capture with customers and partners differ between value chains and ecosystems?
- Is there something else related to value creation and value capture from ecosystem's point of view

Proposition 2**. Platform business model in ecosystems**

- How do you see the role of platforms in ecosystems?
- How do you see value creation and value capture differ in traditional value chains and platform business?
- Is there something else related to value creation and value capture in platform business?

Proposition 3**. Open innovation in ecosystems**

- How do you see the role of innovation and its openness in ecosystems and related to platforms?
- How do you see value creation and value capture differ in traditional value chains and in open innovation business
- Is there something else related to value creation and value capture in open innovation business?

Proposition 4. **Creating own ecosystem**

- How do you compare traditional value chain and creating one's own ecosystem?
- How do you see value creation and value capture differ in traditional value chains and creating one's own ecosystem
- In terms of resources needed and risks involved, how do you see them in creating one's own ecosystem?
- Is there something else related to value creation and value capture in creating one's own ecosystem?

Wrap-up Questions:

- How value is created and captured in the solutions to the Elisa IoT challenge? Can you give an example?
- What is the role of competition in ecosystemic business models?
- Any suggestions you have in mind to offer entrepreneurs on value creation and value capture in the IoT sector?
- Any questions or challenges you consider worth researching in the future recording to value creation and value capture in the IoT sector?
- Can I mention your name in the thesis?
- Can I mention your company name in the thesis?